COMPREHENSIVE DEVELOPMENT STRATEGIES FOR PITHAMPUR AS A SATELLITE TOWN TO INDORE

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submitted to
Visvesvaraya National Institute of Technology, Nagpur
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the degree

Master of Technology
in
Urban Planning

by

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(MT23UPL010)

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Year 2024-25

Department of Architecture and Planning
Visvesvaraya National Institute of Technology, Nagpur

Declaration

I, Akshata Sanjay Parbate, hereby declare that Project Phase II – Report titled "Comprehensive Development Strategies for Pithampur as a Satellite Town to Indore" is carried out by me in the Department of Architecture and Planning of Visvesvaraya National Institute of Technology, Nagpur. The work is original and has not been submitted earlier whole or inpart for the award of any degree/diploma at this or any other Institution / University.

Akshata Sanjay Parbate
Date:

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This to certify that report titled "Comprehensive Development Strategies for Pithampur as a Satellite Town to Indore" is submitted by **Akshata Sanjay Parbate** in partial fulfillment of the requirements for the award of the degree of **Master of Technology in Urban Planning**, VNIT Nagpur. The work is comprehensive, complete and fit for final evaluation.

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Abstract

Indore, the commercial capital and the most populous city of Madhya Pradesh, has emerged as a leading urban agglomeration in Central India, characterized by dynamic economic activity, rapid population growth, and a consistent track record in urban governance. As per Census 2011, the city's population had crossed 32 lakh (3.2 million) and is projected to surpass 50 lakh (5 million) by 2025, marking a staggering growth of over 56% within just 14 years. This surge has been driven largely by rural-to-urban migration, industrial expansion, and the city's strategic location at the crossroads of key national highways. However, this rapid urbanization has exerted tremendous pressure on the city's physical infrastructure, housing, water supply, transportation networks, and environmental resources. To manage this growth sustainably and avoid over-concentration of population and economic activities within the core city, there is a pressing need to develop integrated satellite towns that can absorb the spillover and provide decentralized hubs for employment and living.

Among the potential satellite towns, Pithampur, situated approximately 35 kilometers from Indore along National Highway 3 (Mumbai-Agra Road), stands out as the most viable candidate. Often referred to as the "Detroit of India," Pithampur is Asia’s largest privately managed industrial township, covering an area of over 8,400 hectares and home to more than 1,500 industrial units, including prominent players like Eicher Motors, Force Motors, Bridgestone, Mahindra Two Wheelers, Cipla, and Lupin. The town generates significant employment opportunities and contributes substantially to the state’s GDP and export volumes. Its industrial output and proximity to Indore make it an ideal nucleus for urban expansion and planned urban-rural integration.

Pithampur's economic significance is further amplified by its strategic location along the Delhi-Mumbai Industrial Corridor (DMIC), one of India’s most ambitious infrastructure and industrial development projects. The town is well-connected via the NH-3 and the upcoming Indore-Manmad railway line, enhancing its freight and passenger mobility. Additionally, the proposed logistics hubs, industrial parks, and smart infrastructure under the DMIC sub-projects are poised to accelerate urban development and investment inflows into the region.

Demographically, Pithampur’s population is projected to reach 3.5 lakh (350,000) by 2025, with an annual growth rate exceeding 6%. This necessitates comprehensive planning for residential housing, education, healthcare, recreation, and other civic amenities

In conclusion, the transformation of Pithampur into a well-planned satellite town is not just a regional necessity but also a strategic imperative to secure Indore’s future as a resilient, inclusive, and globally competitive urban center.

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1. Introduction

1.1 Background

Satellite towns are independent or semi-independent urban areas that orbit around larger metropolitan hubs.

Satellite cities are planned cities, adjacent to a prime city. Such cities manage and contain the increasing urban sprawl. They are designed for a major city to extend in all possible ways. They are to house and utilize a mushrooming population; the individuals might fabricate an interest for development of the current settlement in a metropolitan city. Satellite cities are entirely standalone cities, planned, and developed outside metros.(Nine, 2024)

Figure 1. Satellite Towns

Source https://www.re-thinkingthefuture.com

The idea of satellite cities extends beyond mere urban planning; it embodies humanity's ongoing quest for development, balanced by the aspiration for sustainable and livable spaces. Created to mitigate the challenges of urban sprawl, these towns provide a blend of convenience and tranquility for both inhabitants and visitors. By redistributing populations and economic functions, satellite cities contribute to alleviating congestion, enhancing the quality of life, and promoting more equitable urban growth. (Nine, 2024)

1.2 Cities facing Metropolization challenges

Metropolization, is the rapid growth and expansion of cities into large metropolitan areas.The process of merging spatial-functional, political-institutional, and cultural-symbolic processes to create cohesive metropolitan systems from fragmented regions is known as "metropolitanization." It is a dynamic process that includes cities' internal and outward movement. .(Cardoso & Meijers, 2020)

Metropolitan develops in line with resource utilization, investment, and transactions of regional activities. Metropolization of an area gives emerge urban economy that changes the situation, form, and pattern of urban space interactions. On the other hand, metropolism concerns the strategy of changing variation of urban space, so that metropolitan invasion not only form of urban space but also the process of interaction among stakeholders in developing metropolitan area. Metropolitan regions frequently confront a variety of challenges due to their size, density, and fast expansion. Metropolization challenges arise from fast population increase, unplanned urbanization, and inadequate infrastructure, resulting in a variety of cascading challenges.

Figure 2 Metropolization Challenges

1.3 Need of Satellite Cities

- **Rapid population growth of the mother city**

Rapid population growth in major cities is a significant issue faced by developing countries. To address this challenge, city planners often develop satellite towns to accommodate the rising population. In the case of Delhi, nearby areas like Ghaziabad and Faridabad have emerged as satellite towns, primarily serving industrial purposes.

- **Limited land availability:**

If the main city has limited space for further urban expansion, a satellite city can provide additional land for residential and commercial development.

- **Functional specialization**

Functional specialization refers to the growing trend in both developed and developing nations to designate specific areas or satellite towns for particular purposes. For example, in Europe, there are dormitory towns designed primarily for residential purposes, as opposed to mixing residential, commercial, and industrial activities in a single location.

- **Development of transport**

The development of significant transportation routes often leads to the emergence of satellite towns near major cities. As transportation infrastructure continues to grow and evolve, these satellite towns play an increasingly important role in connecting and supporting the main urban centers.

- **Environmental factors**

Environmental factors play a significant role because older towns often suffer from pollution and congestion, prompting the need for new residential areas to be established nearby. Furthermore, satellite towns can also serve as a location for more polluting industries to be relocated, reducing the overall pollution levels in the main city.

- **Implementation of urban planning principles**

Urban planning has shifted its focus towards regional planning. Prior to the Second World War, urban planning mainly involved creating master plans for individual towns without considering the broader regional context. For example, the National Capital Region (NCR) Planning initiative has developed seven satellite towns to help alleviate the pressure on Delhi.

- **Nearby villages developing into satellite town**

Villages near cities in developing countries often transform into satellite towns as a result of the spread of urban influences. This occurs as villagers establish connections with city dwellers, leading to increased economic dependence on the city. (Ananda Krishnan & Sujith, 2021)

Source https://planningtank.com/settlement-geography/satellite-city

1.4 Indicators of Successful Satelite Cities

Contributing Parameters	Description	1	2	3	4	5
Planned Urban Development	Degree of urban planning adopted and its effectiveness	No planning or informal settlements	Basic zoning, minimal execution	Some planned sectors, partial success	Well-structured planning, gaps in execution	Fully planned, integrated, and well-executed
Proximity to Major City	Distance to the parent city	>100 km	80-100 km	50 - 80 km	30 - 50 km	<30 km
	Time Taken for Travel	> 2 hours	1.5 -2 hours	1 -1.5 hours	30 - 60 minutes	< 30 minutes
	Ease and Accessibilty	Poor / No connectivity	Limited transit options	Moderate connectivity	Good connectivity and multiple modes	Seamless integrated multimodal connectivity
Industrial Sector	The diversity and strength of industrial development within the city.	No industrial presence	Few small-scale industries	Balanced industries, moderate presence	Large industrial hubs with regional impact	Major SEZs, international export-driven hubs
Economic Diversification	Variety in employment opportunities across different economic sectors.	Reliance on one sector	Minimal sector diversity	Two major industries, fair balance	Thriving in two to three sectors	Multi-sector growth with equal opportunities
Infrastructure Investments	Quality of infrastructure such as transport, utilities, and urban services.	Poor infrastructure, basic utilities	Few roads, occasional investments	Moderate utilities, growing investment	Advanced networks, consistent funding	World-class infrastructure, integrated systems
Historical Presence / Legacy	Legacy and historical significance of the city, influencing its cultural and socio-economic relevance.	No significant historical legacy	Limited economic impact from historical agents	Moderate impact from historical presence	Significant legacy boosting economy locally	Major historical institution driving global economy
Housing	Availability, affordability, and inclusiveness of housing options.	No planned housing; unstructured growth	Basic housing schemes, poorly executed	Moderate housing plans, with small projects	Planned housing communities, some success	Fully planned housing-focused development; efficient
Governance	Quality of governance, including transparency, efficiency, and citizen engagement.	Inefficient / Not Present	Sporadic services, limited administration	Moderate, semi-transparent processes	Participatory governance, citizen engagement	Proactive governance fostering innovation and transparency
Tourism and Recreation	Recreational and tourism opportunities contributing to the city's livability and economy.	No facilities	Limited attractions, basic amenities	Basic parks, local tourism hubs	Emerging recreational and tourist areas	Thriving with international tourism options

Figure 4 Indicators of Satellite Cities

2. Derivation of Indicators from Project Phase 1

1. Literature Review

- Referred to academic studies, government reports, and urban planning policies.
- Analyzed successful satellite town case studies to identify key development factors.

2. Selection of Key Parameters

- Identified core parameters influencing satellite town development:

- **Planned Urban Development**

This parameter evaluates the extent to which urban planning has been undertaken and effectively implemented. It includes the strategic layout of land use zones, the presence of development control regulations, and execution efficiency. A high rating reflects comprehensive, integrated, and sustainable planning practices supported by effective governance and execution mechanisms. Additionally, the distance to the parent city plays a crucial role in determining the success of a satellite city. Proximity facilitates better economic, social, and physical integration, thereby improving access to markets, employment, and services. Cities within 30 km of the parent city with strong planning integration typically achieve higher success.

- **Proximity to Major City**

This indicator considers both the travel time and the ease of connectivity to the parent or major city. Efficient transportation networks, including highways, railways, and mass transit systems, significantly reduce commute times and foster regional integration. A seamless multi-modal transit system, coupled with strategic location, enhances the satellite city's accessibility and attractiveness to residents and businesses alike.

- **Industrial Sector**

This parameter assesses the presence, scale, and diversity of industrial development within the satellite city. A thriving industrial sector contributes to employment generation, economic growth, and technological innovation. The presence of Special Economic Zones (SEZs), export-oriented units, and industrial corridors reflects high levels of industrial maturity and integration into national and global supply chains.

- **Economic Diversification**

A diverse economic base is essential for the resilience and sustainability of a satellite city. This indicator measures the range of employment opportunities available across various sectors, including manufacturing, services, trade, and technology. Cities with a balanced, multi-sector economy are better positioned to withstand economic shocks and offer long-term growth potential.

- **Infrastructure Investments**

Infrastructure forms the backbone of urban development. This parameter examines the quality and extent of physical infrastructure, including roads, public transportation, water supply, sewerage systems, electricity, and digital connectivity. Advanced infrastructure networks supported by consistent investment lead to improved quality of life, enhanced business productivity, and greater urban efficiency.

- **Historical Presence / Legacy**

This indicator evaluates the cultural, architectural, and historical significance of the city. Cities that preserve and integrate their historical assets into contemporary urban development often enjoy enhanced identity, tourism potential, and community pride. Such cities also attract investments in cultural heritage, conservation, and tourism, thereby boosting the local economy.

- **Housing**

The availability, affordability, and quality of housing stock are critical in determining urban livability. This parameter assesses the diversity and inclusivity of housing options, effectiveness of planning policies, and the extent to which housing addresses population needs. A high-performing satellite city ensures planned, equitable housing development that accommodates various income groups while promoting compact and sustainable urban growth.

- **Governance**

Governance quality significantly influences the effectiveness of urban management and service delivery. This parameter examines institutional transparency, accountability, participatory planning, and administrative efficiency. Cities with proactive, transparent, and citizen-centric governance models are more capable of adapting to challenges and fostering inclusive development.

- **Tourism and Recreation**

This parameter measures the availability and quality of recreational and tourism facilities that contribute to the city's livability and economic base. Satellite cities with well-developed public spaces, cultural venues, parks, and tourist attractions tend to attract both visitors and residents. Integration of such spaces into urban planning enhances social well-being and stimulates economic activity through hospitality and allied sectors.

3. Structuring of Indicators

- Each parameter was broken down into measurable sub-indicators.
- Developed a **5-point scale** to rate the level of development:
  - 1 = Very Poor / No development
  - 5 = Fully developed / Global standards

4. Scoring Framework Development and Refinement

- Defined clear descriptions for each score to ensure consistency and ease of understanding.
- Conceptually tested the matrix to confirm logical progression between score levels.
- Final refinements focused on improving clarity, practical application, and comparability.

1.5 Assessment of Selected Satellite Cities from Project Phase 1

To establish a comparative understanding of satellite city development, ten satellite cities from various global contexts were selected for evaluation. These cities were assessed using the indicator matrix developed during Phase 1, which included parameters such as Planned Urban Development, Proximity to Major City, Infrastructure Investments, Industrial and Economic Strength, Governance, and Tourism.

Secondary data sources such as government reports, urban development plans, research publications, and official city websites were used to gather relevant information. Each city was then rated on a 1 to 5 scale for every parameter:

1 indicated poor or minimal presence
5 represented highly developed or globally competitive standards

The scoring was based on qualitative analysis and available quantitative data. This comparative evaluation provided insights into the strengths and gaps of each city and helped identify best practices for satellite city planning.

Indicator	Satellite City									
	Navi Mumbai	Noida	Mohali	Korangi	Pruszcz Gdanski	Kitchener	Hamilton	Oxford	Cambridge	Marne-la-Vallée
Planned Urban Development	5	4.5	4	3	2	3.5	3	2.5	3	5
Proximity to Major City	4.5	4.5	3.5	3.5	3.5	3.5	4	4	4	4.5
Economic Sector	4	4.5	4	3	3	3.5	4	3.5	4	4.5
Economic Diversification	4.5	4.5	4	3	3	4	4	3.5	4	4.5

Infrastructure Investments	5	3.5	3.5	2.5	2.5	3.5	3	3	3.5	5
Historical Legacy / Presence	2	2	2	2	3.5	4.5	4	5	5	2
Governance	4.5	4	3.5	2.5	3	3.5	3.5	3	3.5	4.5
Housing	4.5	4	4	3	3	3.5	3	3	3.5	4
Tourism and Recreation	3	3	3	2.5	3.5	4	4	4	4.5	5
Future Development Strategies	4.5	4	4	2.5	2.5	4	4.5	4.5	4.5	4

Table 1 Assessment of Selected Satellite Cities

1.6 Key Strategic Insights from Benchmarking Satellite Cities

A comparative assessment of prominent Indian and international satellite cities highlights critical success factors that should guide the planning and development of future urban nodes:

- **Planned Urban Development & Infrastructure (High Priority):** Structured, long-term planning and consistent infrastructure investment—exemplified by Navi Mumbai and Marne-la-Vallée—are foundational for sustainable urban expansion.

- **Proximity and Connectivity to the Parent City (High Priority):** Efficient travel time and multimodal accessibility significantly influence integration and economic viability. Noida, Cambridge, and Marne-la-Vallée demonstrate strong spatial linkages to their core cities.

- **Economic Base and Diversification (High Priority):** Economically resilient satellite cities, such as Noida and Hamilton, support a diverse industrial and service sector, mitigating dependency on a single domain and promoting employment stability.

- **Governance and Housing (Moderate to High Priority):** Effective urban governance mechanisms and adequate, affordable housing contribute to orderly development and enhanced quality of life, as seen in Navi Mumbai and Cambridge.

- **Cultural, Recreational, and Historical Assets (Moderate Priority):** While not essential for all satellite cities, the presence of cultural or educational institutions—as in Oxford and Cambridge—enhances a city's appeal and functional diversity.

- **Future-Oriented Development Strategies (High Priority):** Cities that prioritize sustainability, smart technologies, and adaptable urban frameworks—such as Marne-la-Vallée and Cambridge—are better equipped to address long-term challenges.

These strategic insights underscore the need for an integrated, multi-dimensional planning framework when establishing new satellite cities to support balanced metropolitan growth.

3. Synopsis

1.1 Vision

To transform Pithampur into a Satellite Town, shaping the future of the Indore administrative area by promoting balanced regional growth and addressing challenges faced by rapidly urbanizing cities.

1.2 Aim

To develop comprehensive planning strategies for establishing Pithampur as a satellite town to support and complement Indore as well as promote balanced urban and regional growth.

1.3 Objectives

1. To assess the need and viability of a satellite town for Indore.
2. To explore the potential of the Pithampur town to determine its suitability as a satellite town.
3. Study case cities with satellite towns to understand their necessity and develop a framework for Pithampur as a satellite town to Indore.
4. To identify challenges in realizing the satellite town's development potential, to complement Indore's development.
5. To formulate planning and development proposals for the satellite town, followed by a phased implementation framework for its comprehensive development.

1.4 Need

Indore’s rapid urban expansion has led to increased pressure on infrastructure, resources, and overall urban livability. The projected population growth necessitates planned interventions to prevent congestion, resource depletion, and inefficient urban sprawl. Pithampur, with its strong industrial base and strategic location, presents an opportunity for structured satellite town development to balance regional growth.

1.5 Scope

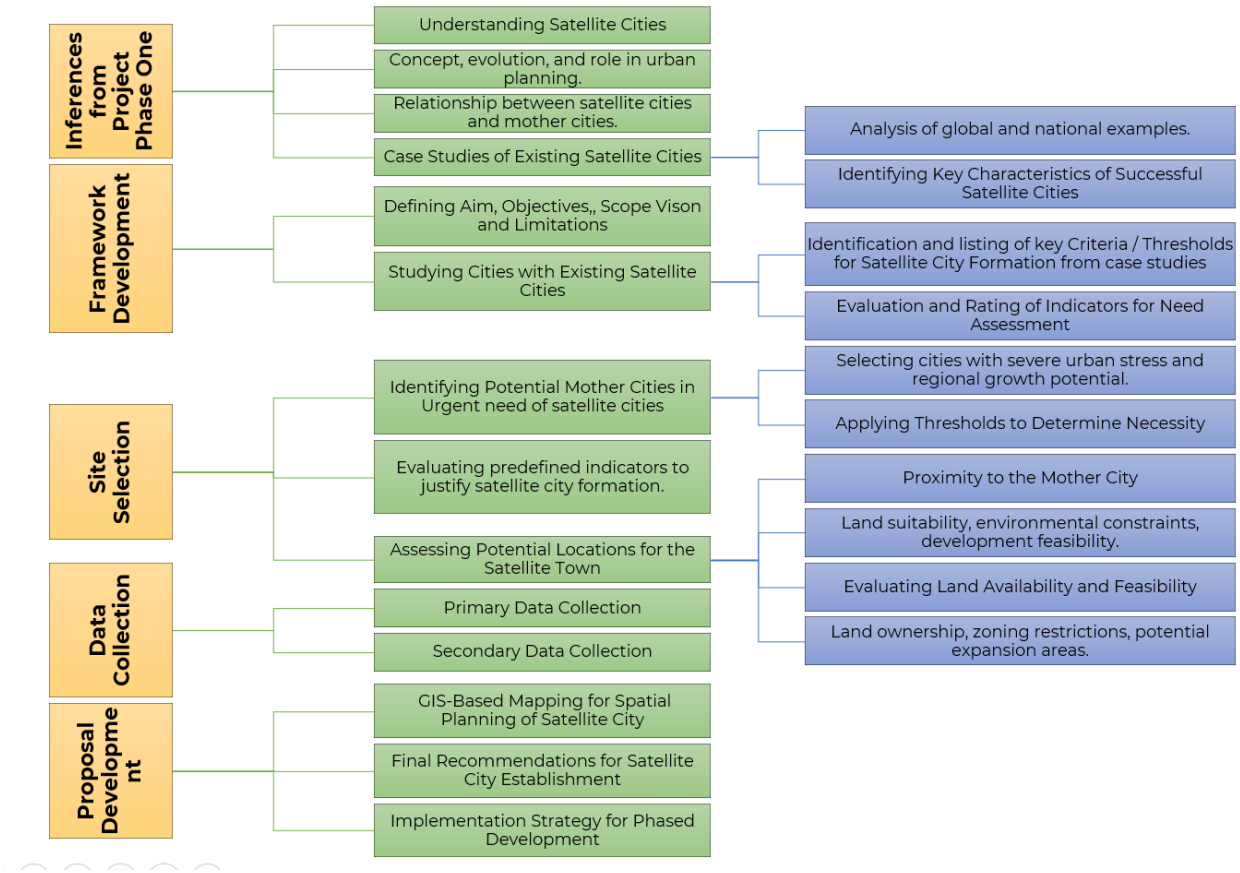
The study will examine Indore’s urban expansion and the potential for developing a satellite town to support its growth. It will explore the role of Pithampur in complementing Indore’s development through strategic urban planning. To establish a strong foundation, the study will include case analyses of successful satellite towns, identifying key planning strategies and best practices for application to Pithampur.

The study will outline a structured development framework and plan, focusing on essential planning aspects to ensure effective implementation to facilitate seamless development.

1.6 Limitations

The study is limited to Pithampur's feasibility as a satellite town and does not explore alternative locations in depth.
Implementation challenges such as political, financial, and administrative constraints are beyond the scope of this research.
The study primarily focuses on macro-level planning, which involves overarching strategies such as land use zoning, infrastructure corridors, and regional connectivity, rather than micro-level execution, which deals with detailed layouts, service networks, and local implementation frameworks.

1.7 Methodology


Inferences from Project Phase One
Framework Development
Site Selection
Data Collection
Proposal Development
Understanding Satellite Cities
Concept, evolution, and role in urban planning.
Relationship between satellite cities and mother cities.
Case Studies of Existing Satellite Cities
Defining Aim, Objectives,, Scope Vison and Limitations
Studying Cities with Existing Satellite Cities
Identifying Potential Mother Cities in Urgent need of satellite cities
Evaluating predefined indicators to justify satellite city formation.
Assessing Potential Locations for the Satellite Town
Primary Data Collection
Secondary Data Collection
GIS-Based Mapping for Spatial Planning of Satellite City
Final Recommendations for Satellite City Establishment
Implementation Strategy for Phased Development
Analysis of global and national examples.
Identifying Key Characteristics of Successful Satellite Cities
Identification and listing of key Criteria / Thresholds for Satellite City Formation from case studies
Evaluation and Rating of Indicators for Need Assessment
Selecting cities with severe urban stress and regional growth potential.
Applying Thresholds to Determine Necessity
Proximity to the Mother City
Land suitability, environmental constraints, development feasibility.
Evaluating Land Availability and Feasibility
Land ownership, zoning restrictions, potential expansion areas.

4. Case Studies

1.1 Jaipur Satellite Cities : A Case of Bagru

Jaipur (Mother City):

- Area: 467 km²
- Population: 3 million

Bagru (Satellite Town):

- Distance from Jaipur: ~40 km
- Area: 15 km² (Town area: 41.65 km²)
- Population: 31,229 (2021); projected to be 53,342 by 2025
- Known for: Traditional block printing industries
- Key driver: Located 1 km from NH-8, spurring urban expansion

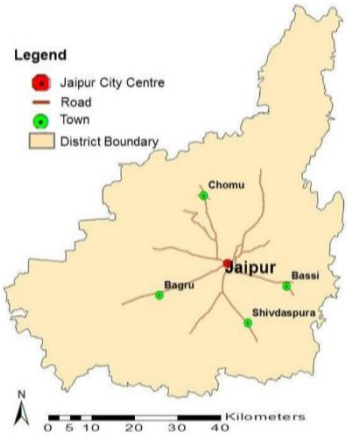


Figure 5 Map of Jaipur City and nearly towns

1. Introduction: The Need for Satellite Towns

Jaipur, the capital of Rajasthan, has witnessed exponential urban growth, with its built-up area increasing fivefold from 1975 to 2016. As the city expands beyond its administrative and infrastructural capacities, the Jaipur Master Plan 2025 introduces the concept of satellite towns to decentralize pressure and promote balanced regional development. Bagru, a small town located about 40 km southwest of Jaipur on National Highway 8 (NH-8), has emerged as a strategic candidate due to its industrial activity, cultural heritage, and regional connectivity.

Figure 6 Map of Bagru Town

Bagru along with Dhamikalan is considered important region within the Jaipur regionlocated at a distance of about 30 kms in south west direction of Jaipur city. Bagru is located in the semi –arid zones with minimum and maximum mean temperature of 7.8°C in January and 40.3°C in May respectively. It is famous for its cloth and hand block printing worldwide. The print is commonly known as 'Bagru print'. The town has compact streets occupied by various craft commodities and one of the major towns on the Jaipur –Ajmer road. Though the old town is 1 km off the NH 8, but presence of NH-8 has forced the urban expansion towards it.. (n.d.). (*Urbanization and Future Development of Satellite Towns Through Gis: A Case Study of Bagru Block, Rajasthan, India*. www.ijfmr.com)

2. Database and Methodology

The study is based on both primary and secondary data inputs. Spatial data from Carto SAT remote sensing imageries, and BHUVAN and Non spatial data from census 2011 have been merged together using GIS techniques mainly arc GIS 9.3 software to prepare an outlay plan proposal of the area as potential growth centre. Field survey through semi closed questionnaire has been conducted to generate the primary statistical data. Data analysis has been done by using simple statistical techniques to represent the data.Landsat Image Classification In GIS for calculation of built up of Jaipur and its Satellite Cities

A land use change analysis was conducted using Landsat image classification in GIS to assess the built-up growth of Jaipur and its satellite towns — Bagru, Chomu, Bassi, and Shivdaspura — from 1975 to 2016.

Key Findings:

1975: Jaipur's built-up area measured approximately 3,209.4 hectares, with its satellite towns accounting for less than 1% of this area.
1989: The city's built-up area increased by 98% compared to 1975, while the built-up areas of the satellite towns more than tripled, indicating early signs of urban sprawl.
2002: Jaipur's built-up area doubled again, reaching a 100% increase from 1975 levels. Notable growth was observed in Chomu, Bagru, and Bassi.
2016: Jaipur city expanded over 30 km in all directions, with an accelerated growth rate surpassing previous decades.

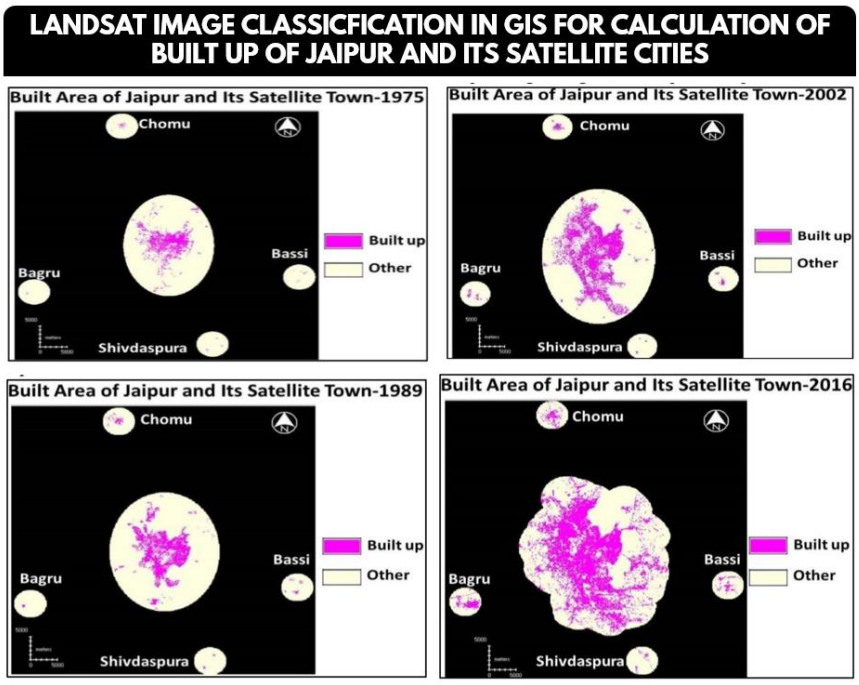

LANDSAT IMAGE CLASSICFICATION IN GIS FOR CALCULATION OF BUILT UP OF JAIPUR AND ITS SATELLITE CITIES
Built Area of Jaipur and Its Satellite Town-1975
Built Area of Jaipur and Its Satellite Town-2002
Built Area of Jaipur and Its Satellite Town-1989
Built Area of Jaipur and Its Satellite Town-2016
Chomu
Bagru
Bassi
Shivdaspura
Built up
Other

Figure 7 Landsat Image Classification for Built Up Calculaton of Jaipur City

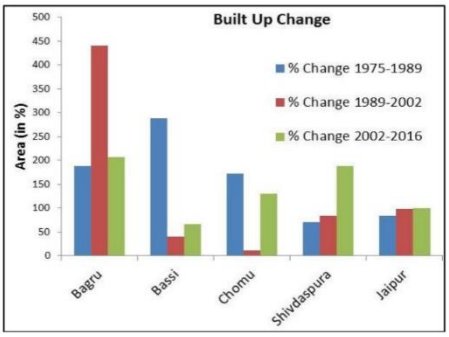


Figure 8 Satellite Cities Analysis

The satellite data-derived land use change analysis highlighted significant built-up growth in all four satellite towns, enhancing their potential for future development and improved regional connectivity with Jaipur. Bagru and Chomu emerged as rapidly growing towns, while Bassi and Shivdaspura showed promising prospects for future urban expansion.

Singh, R., & Kaushik, G. (n.d.). *Urbanization and Future Development of Satellite Towns Through Gis: A Case Study of Bagru Block, Rajasthan, India*. www.ijfmr.com

3. Satellite cities Analysis

Proximity Analysis:
City Centre: Bagru lies within the 40 km buffer, well-connected via national highways.
Railway Station: Equidistant from the Jaipur railway station along with Bassi, moderately accessible.
Bus Stand: Similar to railway proximity, Bagru benefits from highway connectivity.
Airport: Located farther compared to Shivdaspura but accessible via direct roads.
Hospitals: Lies in the 30 km buffer zone; adequate access to major health facilities.
Industrial Areas: Key strength—Bagru is adjacent to the industrial zones on Ajmer Highway, making it ideal for future industrial and economic development.

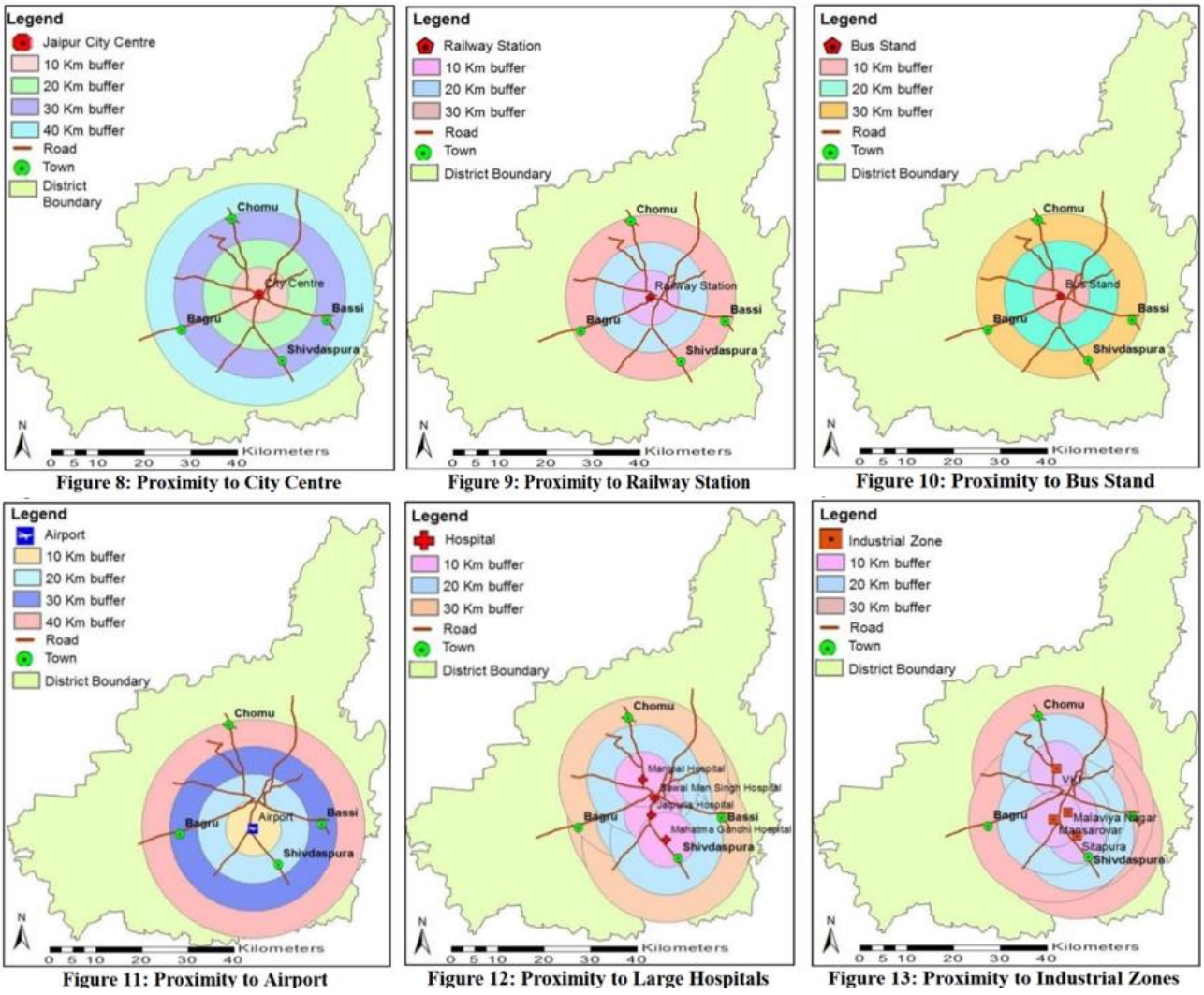


Figure 9 Proximity Analysis using Multiple Buffer Tools for Jaipur and its Satellite Towns

Conclusion:

GIS-based analysis highlights Bagru as a highly promising location for suburban planning due to its exceptional built-up growth and proximity to industrial corridors. The town, along with others like Shivdaspura and Chomu, can play a vital role in implementing Transit-Oriented Development (TOD) strategies. These findings serve as actionable insights for policymakers aiming to achieve sustainable urban expansion for Jaipur.

4. Current Landuse Scenario of Bagru:

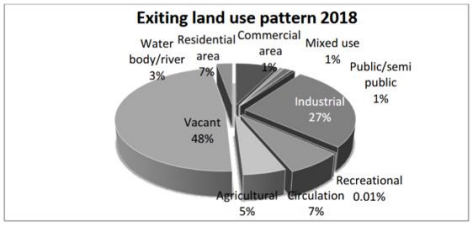


Figure 10 Bagru - Existing Landuse Pattern

Current Land Use

Primarily vacant/unutilized (48%) with industrial dominance (27%). Agriculture is limited (5%) due to water issues. Cloth printing is a key artisan activity. Commercial area is underdeveloped(19%). Linear expansion along NH-8.

Transportation: Well-connected to Jaipur by road (NH-8), but lacks a proper bus station. Railway access is limited (Dhankya station is 12km away). The nearest airport is 35 km away in Jaipur.
Residential: Haphazardly planned residential areas with some mixed-use. Expansion towards the north is constrained by the Sadharia River to the south.
Social Infrastructure: Limited education and health facilities. More development is needed to serve as a satellite town.

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i) Population Projection and Developmental Parameters for Bagru

Comprehensive Land Use Policy:
Adopted from the Jaipur Development Authority (JDU), the policy considers both existing residential density and projected future population growth to guide land use planning and infrastructure provision.

Population Projection:
According to projections, Bagru is expected to house a population of **53,342 by 2025**, with an estimated **density of 4,400 persons per sq. km**. The decadal growth rates have fluctuated, with the highest growth observed between **1981–1991 (49.35%)**, followed by steady increases in subsequent decades.

Year	Population	Population Increase	Decadal Growth Rate (%)
1971	9,014	—	—
1981	13,462	4,448	49.35
1991	18,868	5,406	40.16
2001	26,534	7,666	38.63
2011	36,061	9,527	32.87
2021	53,342	5,561	34.83

---

ii) Developmental Parameters:

To support the projected population, a plan for appropriate infrastructure is proposed, emphasizing **Balanced Regional Development** in alignment with the Jaipur region's master plan. The land has been categorized for specific uses:

- **U-1, U-2, U-3 Areas:** Including all use zones such as residential area, Located along NH & SH with specific depth as per developmental proposal.
- **G-1 Area:** Is green/ eco sensitive area like hills, river courses, water bodies, reserved
- forest area etc.
- **G-2 Area:** Is buffer zone along Sadriya river(located in the southern part of the town)
- **Rural and Ecological Areas:** Managed as per ecological and regional development guidelines.

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iii) Prescribed Land Use Pattern for Bagru

A comprehensive land use plan has been proposed for Bagru town based on projected population needs and development parameters:

Category	Proposed Percentage	Details
Industrial	32%	Develop 48% of vacant land into well-planned sectors, focusing on RIICO expansion and Chitroli industrial complex.
Residential	20%	Expand along NH-8 and around existing settlements with a

Category	Proposed Percentage	Details
		density of 90 PPH.
Commercial	4%	Develop market hubs along major roads, integrating with existing mixed-use areas.
Recreational	2–3%	Develop parks and open spaces (currently less than 0.05%).
Public Utilities & Community Infrastructure	28.43%	Strengthen public services, institutions, and amenities in the northern part for better accessibility.
Roads & Connectivity	N/A	Improve higher-order roads in the south; enhance bus terminals along NH-8; maintain existing road network.
Interface/Buffer Zone	N/A	Use land categories to protect eco-sensitive areas, water channels, and agricultural zones.

Table 2 Prescribed Lan Use Pattern for Bagru

Figure 11 Proposed Landuse Map of the Bagru Town based on land categorisation and developmental parameters

The proposed development strategy aims to transform Bagru into a well-planned, balanced satellite town supporting industrial, residential, and commercial growth while safeguarding ecological and agricultural areas. This approach ensures alignment with Jaipur's regional development objectives and addresses the infrastructural needs of the growing population.

Source: Singh, R., & Kaushik, G. (n.d.). *Urbanization and Future Development of Satellite Towns Through Gis: A Case Study of Bagru Block, Rajasthan, India*. www.ijfmr.com

Dadhich*, P. N., & Sharma, D. (2019). GIS Based Assessment of Satellite Town of Jaipur City for Sub Urban Planning. *International Journal of Recent Technology and Engineering (IJRTE)*, *8*(4), 7579–7583. https://doi.org/10.35940/ijrte.D5342.118419

1.2 Rajarhat New Town, Kolkata — A Planned Satellite Township

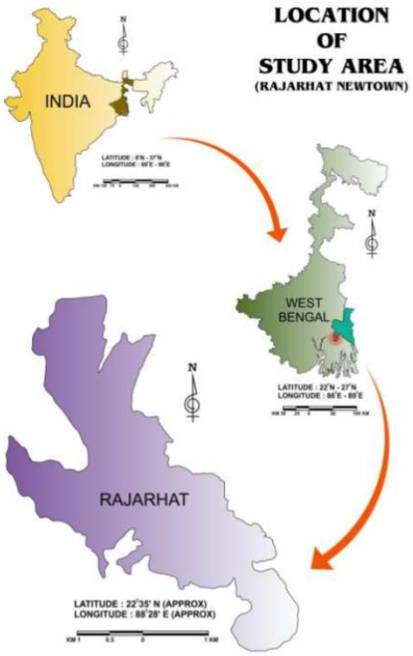

Figure 12 Location of Rajarhat New Town

Introduction:

Rajarhat is a neighbourhood of Kolkata, located in North 24 Parganas district of the Indian state of West Bengal. Lying just on the periphery of the planned New Town, Kolkata, Rajarhat has seen huge spurt in real estate development. The New Town Kolkata was enabled with 10.5km of Wi-fi Zone connecting the Rajarhat Main Arterial Road to the airport to sector V, which also makes it India's first Wi-fi road connectivity. The stretch has already been declared as a green corridor. New Town is located at 22°21́ N to 22°35́ N and 88°17́ E to 88°28́ E. This Township covers an area of 67km2 and is located in Barasat Sadar Division of North 24 Parganas, District, West Bengal, India. Biswas, A., & Singh, O. (n.d.). *Rajarhat New Town an Urban Perspective: A Case Study of Urbanization, West Bengal, India*. www.ijntr.org

Planning Framework and Development Strategy:

1.Urban Structure

Rajarhat New Town has been systematically divided into three major development zones, commonly referred to as Action Areas I, II, and III, each assigned with distinct functional characteristics.

Action Area I

Action Area I is primarily developed as a mixed-use zone. It comprises:

- Residential neighborhoods,
- A Sub-Central Business District (Sub-CBD),
- Several commercial plots and shopping malls.

This zone serves as the initial urban core of New Town and includes a variety of housing typologies along with essential amenities.

Action Area II

Planned as the primary commercial and institutional hub of New Town, Action Area II is expected to accommodate:

- The main Central Business District (CBD),
- Institutional and IT campuses including DLF, Unitech, Infosys, and Wipro,
- High-rise residential complexes and apartment townships,
- Cultural and recreational landmarks such as the Kolkata Museum of Modern Art and a vast Eco Park surrounding a natural water body.

A sub-region within this area, Action Area II C, is primarily residential in nature, with several ongoing and completed housing projects such as Highland Woods, Akankha, Sunrise Point, Moonbeam Housing, and Starlit.

Action Area III
This zone is largely residential, characterized by:

- High-density apartment complexes,
- Mini-townships and upscale gated communities including Uniworld City, Sukhobristi, DLF New Town Heights, Rosedale (Shrachi), Eden Court (Tata), and Elita Vista (Keppel).

Additionally, Action Area III is emerging as a major educational and institutional hub, with campuses planned or under development for institutions such as IIT Kharagpur and St. Xavier's College. A large arts academy is also operational in this area, enhancing its cultural and educational identity.

2. Road and Bridge Infrastructure
New Town's physical infrastructure has been strategically developed to support its urban growth and connectivity objectives. A number of major road and bridge projects have been completed to facilitate seamless movement within and across Action Areas. Notable infrastructure includes:

- 6 lanes Bridge over Krishnagar Canal.
- Major Arterial Road of 59 metre width and 10.75 kilometres long.
- Bridge over Bagjola Canal on existing MAR alignment.
- 2nd Bridge over Bagjola Canal or North-South corridor.
- Fly Over on the MAR and VIP Road Junction.
- Bailey bridge over Bagjola Canal.

Three small bridges over Link Canal.In line with sustainable planning principles, the township incorporates ample open spaces, green buffers, water bodies, and parks, reinforcing its identity as an environmentally conscious urban entity.

3. Transportation System
3.1 Public and Private Transport Modes
The transportation system in New Town integrates both formal and informal modes. The main forms of public transport include:
Government and private buses (both air-conditioned and non-air-conditioned),
Taxis and auto-rickshaws.
Despite the availability of public transport, bus services remain limited in frequency and route diversity, impacting overall accessibility.

3.2 Metro and Rail Connectivity
The proposed extension of the New Garia–Airport Metro Corridor, which was expected to pass through New Town by 2014, is still under construction due to administrative and technical delays. Additionally, a circular railway line is proposed to connect New Town with Bidhannagar Road (Ultadanga), via Lake Town and Salt Lake, which is likely to enhance future rail connectivity.

The Netaji Subhas Chandra Bose International Airport, located in close proximity, ensures robust air connectivity to domestic and international destinations.

4. Traffic and Mobility Patterns
A transportation survey conducted across various sectors of New Town reveals significant traffic movement, particularly:
Between Sukhobristi and Infospace, which shows the highest traffic volume, indicating the daily

commuting patterns between residential and employment zones.

A moderate level of movement is observed between Sector V and Rabindra Tirtha.
These corridors serve as vital links to key educational institutions, office complexes, and commercial centers, making them crucial for daily urban mobility. The vehicular composition includes:
Private cars, which form the majority of the traffic,
Followed by motorcycles, buses, and taxis,
Rickshaws are limited to select localities with lower traffic densities,

Other service and commercial vehicles show average usage patterns.
The development plan incorporated comprehensive infrastructure provision, including a hierarchical road network, modern drainage and sewage systems, open green spaces, and provisions for mixed-use development to create a self-sustaining urban environment.

Key Urban Features:
Integrated IT Hub: Rajarhat has emerged as a significant IT and services cluster, attracting major national and multinational firms, thereby contributing to regional economic diversification.
Eco Park: One of India's largest urban parks, this green infrastructure initiative supports environmental conservation, biodiversity, and leisure activities.
Mixed-Use Urban Form: The township integrates residential, commercial, institutional, and recreational functions within well-defined zones, promoting urban efficiency and liveability.
Enhanced Connectivity: Strategic transport linkages, including arterial roads, expressways, and planned metro rail connectivity, ensure seamless integration with Kolkata and adjacent urban areas.

Relevance to Study:
Rajarhat New Town provides a relevant reference model for the proposed development of Pithampur as a satellite town to Indore. Its structured zoning, phased implementation of infrastructure, prioritization of economic anchors (such as industrial and IT zones), and emphasis on green and recreational infrastructure offer valuable planning principles that can be adapted to the local context of Pithampur. Furthermore, the township's focus on regional connectivity and sustainable urban design aligns with contemporary approaches to balanced metropolitan growth management.

Conclusion
The case of Rajarhat New Town exemplifies a proactive and structured approach to urban expansion and satellite town development. Its integrated land use planning, infrastructure-led growth strategy, and ecological considerations present a comprehensive framework that can inform future urban development initiatives, particularly for emerging satellite towns in rapidly urbanizing regions like Indore.

Source: Biswas, A., & Singh, O. (n.d.). *Rajarhat New Town an Urban Perspective: A Case Study of Urbanization, West Bengal, India*. www.ijntr.org

1.3 Jamshedpur : Industrial City

1. Introduction

Jamshedpur is one of India's earliest and most successful planned industrial cities. Conceived by industrialist Jamsetji Tata, the city was envisioned as a model industrial township that would balance economic productivity with quality urban living.

2. Planning Initiative

In 1908, Tata Steel commissioned American engineers Julian Kennedy and G.H. Wilkins of Julian Kennedy, Sahlin and Co. to design the layout of the city. The aim was to support large-scale industrial operations while ensuring modern civic amenities for workers and residents.

3. Phases of Planning

Figure 13 Phases of Planning - Jamshedpur

- Initial Planning Phase (Pre-1920s)

In 1908, Tata Steel appointed Julian Kennedy, Sahlin and Co., a Pittsburgh-based engineering firm, to prepare the city's layout. The initial focus was on establishing basic infrastructure to support the steel plant. The city's design included distinct zones for industry, residential housing, and civic amenities, laying the groundwork for a functional industrial township.

- Garden City Influence (1920s–1940s)

During this phase, the planning incorporated principles from Ebenezer Howard's Garden City Movement. The layout emphasized green spaces, tree-lined avenues, and separated zones for residential and industrial use. The city was designed with a gridiron road pattern to facilitate efficient mobility and utility services.

- Post-Independence Expansion (1950s–1980s)

This phase witnessed rapid industrial growth and urban expansion, leading to informal settlements on the city's periphery due to increased migration. The spatial development resembled a blend of Hoyt's Sector Model and the Concentric Zone Model, with industrial and residential zones forming in layers around the central plant.

- Modern Planning and Governance (1990s–Present)

In the 1990s, Jamshedpur adopted a more technology-driven and sustainable planning approach. The formation of JUSCO (Jamshedpur Utilities and Services Company), a Tata initiative, marked a shift

to corporate-led urban governance. This phase emphasized service efficiency, environmental sustainability, and smart urban management practices.

4. Urban Planning Models Used

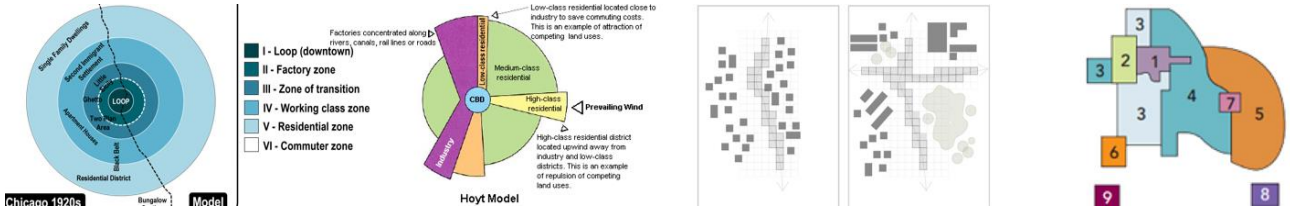
Chicago 1920s Model
I - Loop (downtown)
II - Factory zone
III - Zone of transition
IV - Working class zone
V - Residential zone
VI - Commuter zone
Factories concentrated along rivers, canals, rail lines or roads
Low-class residential located close to industry to save commuting costs. This is an example of attraction of competing land uses.
Medium-class residential
High-class residential
Prevailing Wind
High-class residential district located upwind away from industry and low-class districts. This is an example of repulsion of competing land uses.
CBD
Industry
Low-class residential
Hoyt Model

Figure 14 Urban Plannng Models used for Industrial Town Jamshedpur

- Garden City Model
  - Inspired the early planning with concepts like decentralization, green belts, and neighborhood units.
- Gridiron Pattern
  - Implemented for road layout to enhance accessibility and simplify infrastructure development.
- Sector and Concentric Zone Models
  - Observed in the spatial organization during expansion, with land uses forming sector-wise and concentric rings around industrial hubs.
- Public-Private Partnership Model
  - JUSCO's management of urban services showcases an effective PPP model, combining corporate efficiency with civic responsibility.

5.Inferences

Jamshedpur's evolution through various planning phases and models illustrates how industrial cities can successfully balance economic growth with urban livability. Its planning approach—combining structured design, phased expansion, and innovative governance—continues to serve as a model for industrial urban development in India.

5. Introduction to Study Area – Indore City

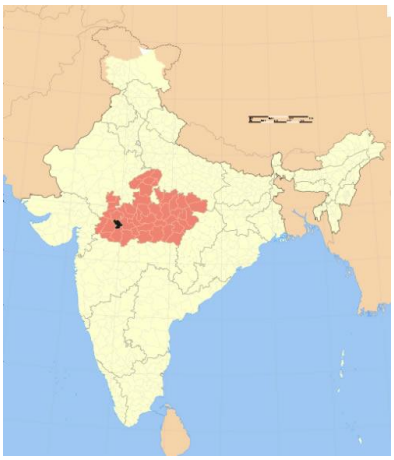

Figure 15 Map of MP in India

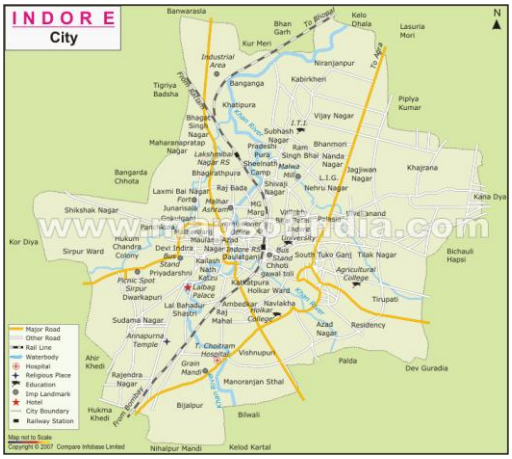

Figure 16 Map of Indore

Indore is a prominent urban center located in the Indore District of **Madhya Pradesh**, India. As the most populous city in the state, Indore plays a pivotal role in regional development due to its strategic location, economic prominence, and socio-cultural vibrancy. The city spans an area of approximately 530 square kilometers and ranks 14th among metropolitan cities in India. Its centrality and strong urban infrastructure make it a key node for commerce, education, and governance. The spatial structure of Indore has evolved in a radial pattern, with the central core expanding outward in response to growing urban demands. This pattern has allowed the city to absorb adjoining settlements and accommodate increasing population pressures while maintaining its functional coherence.

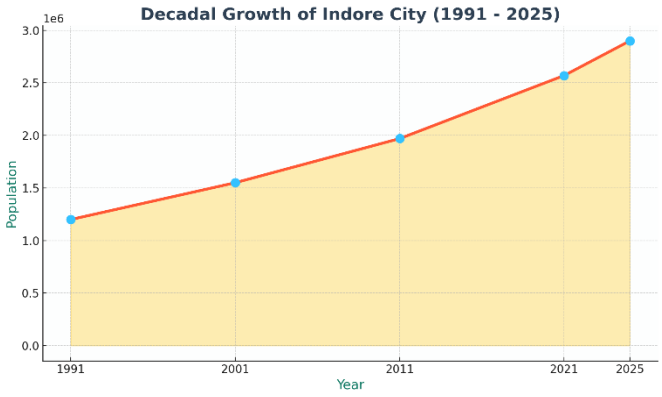

Figure 17 Demography - Decadal Growth of Indore City

Indore's population has shown significant and consistent growth over the past few decades, indicative of its rising urban appeal and economic opportunities. The population rose from **1.2 million in 1991** to **1.535 million in 2001,** further increasing to **1.964 million in 2011** and **2.553 million in 2021**. Projections estimate that the population may reach approximately **2.87 million by 2025**. This represents a decadal growth rate of nearly **28–30%,** driven largely by rural-to-urban migration, natural population increase, and economic migration from smaller towns and villages in the region. The growing population has led to the expansion of the city's administrative boundaries, with more than 120 villages already integrated into the municipal area. In the past year alone, 19 new villages were added, demonstrating the ongoing trend of peri-urban development and increasing the spatial footprint of the metropolitan region.

1.1 Urban Planning and Governance Framework

The governance and planning of Indore's urban growth are managed primarily by the Indore Development Authority (IDA), which is responsible for preparing and implementing city development strategies. The IDA follows a 10-year Master Plan framework to guide infrastructure development, zoning regulations, and urban design. However, the pace of population increase and unregulated urban sprawl have often outpaced the effectiveness of these planning mechanisms. Although planning documents provide a broad vision for the city, execution on the ground has been challenged by resource constraints, administrative delays, and coordination issues across multiple urban local bodies.

Several challenges have emerged as a result of rapid and sometimes uncoordinated growth. These include the unorganized spatial distribution of land use functions, which results in inefficient land utilization and conflicting land uses. Housing shortages and rising real estate prices have contributed to overcrowding, particularly in informal settlements and low-income areas. Moreover, traffic congestion has intensified due to the predominance of private vehicle use and inadequate mass transit systems. These issues are further compounded by the neglect of ecological resources, especially urban rivers and green belts, which are increasingly under threat due to encroachment and pollution. The imbalance between planned development and spontaneous growth continues to be a major concern for the long-term sustainability of Indore.

1.2 Urban Growth and Land Use Change

Urban expansion in Indore has had a significant impact on its land use and land cover (LULC)

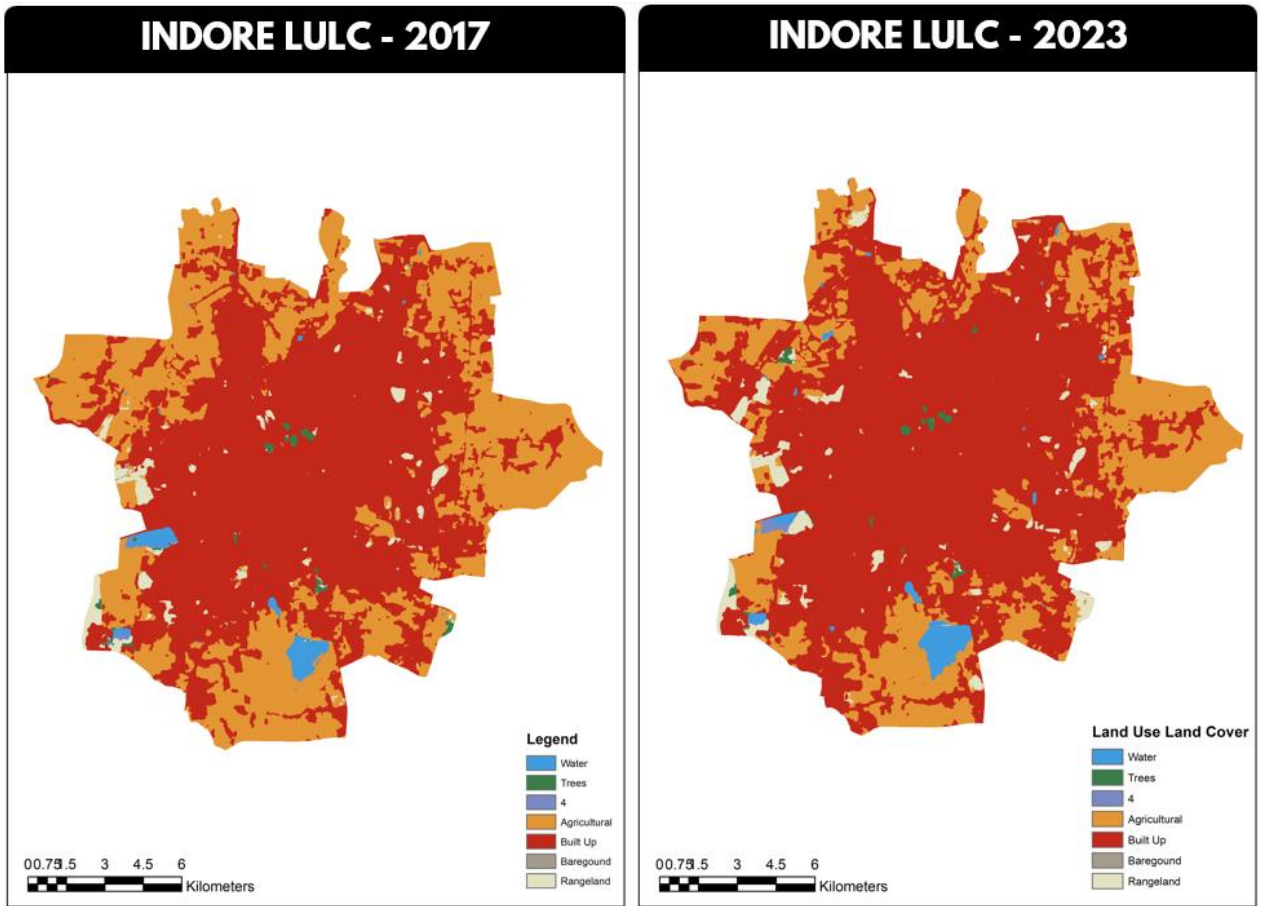

Figure 18 LULC Change in Indore Municipal Area

patterns. A comparative analysis of LULC maps from 2017 and 2023 reveals a clear trend of increasing built-up area, particularly in the peripheral regions. In 2017, approximately 160 sq. km of the municipal area was classified as built-up, accounting for 57.97% of the total area. By 2023, this figure had risen to 185 sq. km, or 67.03%, indicating a 10% increase in the built-up area within just six years. This rapid conversion of agricultural land and open spaces into urban fabric has raised concerns regarding the loss of ecological assets and the sustainability of urban expansion.

The growth pattern highlights a shift from a compact urban form to more dispersed, low-density developments, often on the fringes of the city. Such growth has led to the fragmentation of green spaces, reduction in tree cover, and increased vulnerability of ecologically sensitive areas. The land use change is also reflective of the broader socio-economic transformation of Indore, where rising demand for housing, commercial spaces, and transport infrastructure drives the conversion of rural landscapes into urban zones. Without adequate environmental safeguards and planning controls, this trajectory poses risks to the long-term livability and resilience of the city.

1.3 Migration, Mobility, and Environmental Concerns

Migration has played a major role in shaping the demographic and social landscape of Indore. Migrants account for nearly 52% of the city's population, many of whom come from nearby rural areas and smaller towns in search of employment and better living standards. While this influx supports the city's economy and labor market, it also exerts pressure on urban infrastructure, housing, sanitation, and public services. Unregulated settlements and informal housing clusters are common outcomes of this migration, further complicating the task of planned urban development.

Mobility in Indore is increasingly dominated by private vehicle usage, with traffic networks primarily designed to optimize car movement rather than support inclusive, multi-modal transportation systems. This has led to persistent traffic congestion, especially during peak hours, and a rise in vehicular emissions. The city's two prominent riverbanks have also suffered from neglect, with increasing urban sprawl leading to pollution and reduced ecological function of these vital natural systems. The cumulative impact of poor mobility planning, population pressure, and environmental neglect underscores the urgent need for an integrated urban strategy that balances development with ecological stewardship and social equity.

1.4 Assessment of Indore Against Benchmark Parameters

Evaluating Indore across key urban indicators helps determine whether it requires a satellite town. These parameters highlight capacity stress, inefficiencies, and future growth limitations.

i) Population Density and Urbanization Rate

Population density measures how many people live per unit area, while urbanization rate tracks how quickly areas urbanize. High values in either indicate rising pressure on land and services. When these exceed manageable levels, expanding into a satellite town helps ease this burden.

ii) Infrastructure Utilization and Mobility Stress

Indicators like public transport load, congestion levels, and commute time show how well infrastructure supports daily life. Overloaded systems suggest the need for decentralization to reduce travel time and improve mobility—roles a satellite town can fulfill.

iii) Spatial Extent and Urban Form

City size and growth pattern define spatial manageability. Unplanned horizontal expansion leads to urban sprawl. A satellite town offers controlled, planned development that can contain growth and improve service efficiency.

iv) Economic Dependence and Risk

These indicators assess sectoral diversity and economic stability. Heavy reliance on a single sector makes cities vulnerable. Satellite towns can promote new industries, reducing economic concentration in the core city.

v) Environmental Quality

Air quality reflects the city's environmental health. High pollution levels often result from traffic and dense urban activities. Developing satellite towns can distribute urban functions and lower the environmental load on the main city.

vi) Housing and Basic Services

Housing indicators examine affordability, slum prevalence, and access to services. A deficit in these areas points to overcrowding and poor living standards. A satellite town can accommodate future housing needs with better planning.

vii) Urban Sprawl and Growth Pressure

Urban sprawl measures the extent of uncontrolled expansion. When cities grow without planning, land use becomes inefficient. A satellite town can guide structured growth and avoid random spread.

Category	Indicator	Benchmark	References
Population Density	High Density	>10,000 persons per sq. km	URDPFI Guidelines 2014
	Moderate Density	5,000–10,000 persons per sq. km	URDPFI Guidelines 2014
	Low Density	<5,000 persons per sq. km	URDPFI Guidelines 2014
Urbanization Rate	Low, Moderate, High	<2%, 2–5%, >5%	World Bank Urbanization Report
Infrastructure Utilization	Public Transport Utilization	Beyond 70–80% of capacity	National Urban Transport Policy (NUTP)
	Road Congestion	Total travel time / free flow time	NUTP / Urban Mobility India Reports
	Traffic Congestion Index	>75%	NUTP
	Average Commuting Time	>60 minutes (one way)	NUTP
City Size / Area	Size	300–400 sq. km area	URDPFI Guidelines 2014
	Characteristic	Large spatial extent → urban sprawl	URDPFI Guidelines 2014
Economic Activity	Diversification	Concentration in core sectors	World Bank Urbanization Report
	Risk	>70% dependent on a single sector	World Bank Urbanization Report
Air Quality Index (AQI)	AQI Value	>200 / >150 throughout the year	CPCB India AQI Standards
Housing & Slums	Rented Housing	>20–30% of city population	Census of India 2011
	Slum Population	> population of substandard housing	Census of India 2011
	Infrastructure Provisions for Households	>25–30% of households lacking infrastructure	URDPFI Guidelines 2014
Urban Sprawl Index	Urban Growth	Unplanned growth >50% of urban expansion over a decade	UN-Habitat / World Bank Reports

Table 3 Parameters for Mother City - Benchmarks Indicating need of Satellite Town

1.5 Rating of Parameters – For Selection of Satellite City

1. Annual Population Growth Rate

This parameter evaluates the yearly percentage increase in population. A very high growth rate (>2.5%) may indicate excessive pressure on infrastructure and services, leading to unplanned urban sprawl. Conversely, a very low rate (<0.5%) may reflect limited urban dynamism and economic activity. Ideally, a moderate growth rate (1–2%) is considered sustainable for satellite cities as it allows balanced expansion with manageable demands on infrastructure.

2. Current Population

The current population size of a city reflects its urban scale. Mega cities (>10 million) are typically not suited to be satellite cities due to their size and complexity. Satellite cities are more viable when they fall under medium (1–3 million) or small city (<1 million) categories, making them easier to manage and plan for in coordination with a parent metropolis.

3. Population Density

Population density (persons per sq. km) indicates how densely populated an area is. Extremely high density (>20,000/km²) signifies overcrowding and strains on services, while very low density (<5,000/km²) might reflect underutilized infrastructure. An optimal density range (5,000–15,000/km²) supports urban vibrancy without compromising quality of life.

4. Transportation Speed (Average Peak Hour)

This reflects the average speed of movement (in km/h) during peak traffic hours. Lower speeds (<10 km/h) imply heavy congestion and poor traffic flow, whereas higher speeds (>25 km/h) indicate smooth mobility. Efficient transportation systems improve connectivity to the parent city and within the satellite area, making 20–25 km/h a desirable benchmark.

5. Water Supply/Power Demand (Percentage Increase)

This assesses the increase in demand for essential services like water and power. A critical increase (>10%) suggests infrastructure stress. Ideally, the rate of increase should be less than 5%, ensuring that supply systems are able to meet growing demands without being overburdened.

6. Education Ratio (Literacy Rate)

The literacy rate is a fundamental human development indicator. Low literacy levels (<70%) reflect poor educational infrastructure and reduce the human capital potential. Literacy rates above 85% are indicative of a well-educated population capable of supporting diverse employment sectors in the satellite city

7. Healthcare (Public Hospitals per 100,000 Population)

This measures the availability of public healthcare facilities. Fewer hospitals (<1 per 100,000)

highlight serious deficiencies. Well-served cities have 4 or more hospitals per 100,000 residents, ensuring adequate health services and contributing to a higher quality of life.

8. Recreation Space (% of Total Area)

The share of urban space allocated for recreational use (parks, playgrounds, etc.) reflects environmental and social well-being. Critically low levels (<2%) suggest neglect of public leisure spaces. At least 10–20% of the land should be dedicated to recreational uses to enhance liveability.

9. Green Cover (% of Total Area)

Green cover contributes to environmental quality and climate resilience. Critically low green cover (<10%) intensifies urban heat islands and pollution. A minimum of 20% green cover is recommended for ecological sustainability in satellite cities.

10. Environment of Growth

This is a qualitative assessment of spatial development. Overcrowded environments suggest poor planning, while balanced or dispersed layouts are indicative of thoughtful urban design that accommodates future growth without congestion.

11. GDP Growth Rate

The Gross Domestic Product (GDP) growth rate indicates the economic health of the area. Negative or stagnant growth (<0%) reflects declining economic activity. High to excellent GDP growth rates (6–8% or more) signal robust economic performance and job creation potential.

12. Industrial Growth Rate

This represents the expansion of industrial and manufacturing activities. Declining or slow growth reflects weakening economic base. Satellite cities must target growth rates above 7% to maintain economic relevance and reduce dependency on the parent city.

13. Land Use Efficiency

This assesses how effectively land is utilized. Very low efficiency (<60%) shows dispersed and wasteful land development. High to very high efficiency (80–90%) ensures compact growth, reducing travel distances and infrastructure costs.

14. Occupancy Rate

This refers to the percentage of buildings (residential or commercial) that are currently occupied. Low occupancy (<60%) may suggest overdevelopment or lack of demand. Optimal occupancy (85–95%) ensures infrastructure is being used effectively and that there is demand-driven development.

15. Employment Generation (Percentage of Population Employed)

This indicates the share of population engaged in employment. Very low employment (<60%) reflects economic weakness or dependency. Rates above 80% are desirable as they show active economic participation and a strong labor market.

Parameter	1	2	3	4	5
Annual Population Growth Rate	Very High (>2.5%)	High (2-2.5%)	Moderate (1.5-2%)	Low (1-1.5%)	Very Low (<1%)
Current Population	Mega City (>10 million)	Metropolitan (5-10 million)	Large City (1-5 million)	Medium City (0.3-1 million)	Small City (<0.3 million)
Population Density	Extremely High (>20,000/kmÂ²)	Very High (15,000-20,000/kmÂ²)	High (10,000-15,000/kmÂ²)	Moderate (5,000-10,000/kmÂ²)	Low (<5,000/kmÂ²)
Transportation Speed (avg. peak hour)	Highly Congested (<10 km/h)	Congested (10-15 km/h)	Moderate (15-20 km/h)	Good (20-25 km/h)	Excellent (>25 km/h)
Water Supply	Severe Shortage (<70 LPCD)	Deficient (70-100 LPCD)	Basic (100-135 LPCD)	Adequate (135-150 LPCD)	Surplus (>150 LPCD)
Power Demand (% increase)	Critical (>10%)	High (7-10%)	Moderate (5-7%)	Low (3-5%)	Minimal (<3%)
Education Ratio (Literacy)	Very Low (<60%)	Low (60-70%)	Moderate (70-80%)	High (80-90%)	Very High (>90%)
Healthcare (Public hospitals per 100,000)	Severely Deficient (<1)	Deficient (1-2)	Basic (2-3)	Adequate (3-4)	Well-served (>4)
Recreation Space (% of total area)	Severely Deficient (<5%)	Deficient (5-10%)	Basic (10-15%)	Adequate (15-20%)	Ample (>20%)
Green Cover	Critically Low (<10%)	Low (10-15%)	Moderate (15-20%)	Good (20-33%)	Excellent (>33%)
Built Environment (% of area)	Overcrowded (>80%)	Highly Dense (70-80%)	Dense (60-70%)	Moderate (50-60%)	Balanced (<50%)
GDP Growth Rate	Negative (<0%)	Low (0-4%)	Moderate (4-6%)	High (6-8%)	Very High (>8%)
Industrial Growth	Declining (<0%)	Slow (0-4%)	Moderate (4-7%)	Good (7-10%)	Excellent (>10%)
Commercial Space Occupancy	Very Low (<60%)	Low (60-70%)	Moderate (70-80%)	High (80-90%)	Very High (>90%)
Employment Generation	Very High (>10%)	High (7-10%)	Moderate (5-7%)	Low (3-5%)	Very Low (<3%)

Table 4 Rating of Parameters - for Selection of Satellite City

1.6 Rating of Parameters for Indore City

Parameter	Value	Rating (1-5)	Description	Remarks

Annual Population Growth Rate	**2.76%**	**1**	Very High	Critical growth pressure – **Needs decentralization**
Current Population (2024)	**3,393,380**	**3**	Large City	Manageable urban size – **monitor sprawl**
Population Density	**5,419 per kmÂ²**	**3**	Moderately High	Moderate density – requires density management
Transportation Speed (avg. peak hour)	**18 km/h**	**2**	Congested	Traffic congestion – **improve public transport**
Water Supply	**74 - 98 LPCD**	**2**	Deficient	Water deficit – augment water sources
Power Demand Annual (% increase)	**7%**	**2**	High	Manageable power demand – ensure infrastructure upgrade
Education Ratio (Literacy)	**85.87%**	**5**	Very High	Excellent education level – **maintain efforts**
Healthcare (Public hospitals per 100,000)	**60 for 2.87 million**	**2**	Basic	Healthcare deficient – increase facilities
Recreation Space (% of total area)	**6% of ABD area**	**2**	Deficient	Severely deficient recreation – plan green spaces
Green Cover	**20.00%**	**3**	Moderate	Moderate green cover – scope for improvement
Built Environment (% of area)	**68.28%**	**3**	Dense (60-70%)	Dense built environment – need balance
GDP Growth Rate	**12% CAGR**	**5**	Very High	Strong economic growth – **maintain trajectory**
Industrial Growth	**7-8% Annually**	**4**	Good	Healthy industrial sector – **continue incentives**
Commercial Space Occupancy	**-**	**-**		Data not available – need monitoring
Employment Generation (Unemployment rate)	**12.4**	**5**	Very High	High employment generation – **positive indicator**

Table 5 Rating Parameters for Indore City

Indore's escalating urban challenges—including a high annual population growth rate of 2.76%, moderate population density (5,419 persons/km²), deficient public infrastructure (notably in water supply, healthcare, and recreation), and increasing traffic congestion (average peak hour speed of 18 km/h)—indicate mounting stress on core urban systems. Despite strong economic performance and high literacy, the imbalance between growth and livability necessitates spatial redistribution. Establishing a satellite town would support planned decentralization, ease infrastructural strain, enhance service delivery, and accommodate future urban expansion in a structured manner.

1.7 Identification of Potential Satellite Towns around Indore

Indore – Potential Satellite Towns

1. Introduction

As part of the strategic regional planning initiative for Indore, the satellite towns of Pithampur, Dewas, and Sanwer have been identified for their potential to support the city's industrial, manufacturing, agricultural, and service sector development. These towns are located within a 40 km radius of Indore and play a critical role in decentralizing growth and reducing pressure on the core city.

2. Overview of Satellite Towns

The selection of these satellite towns is based on their geographical proximity, existing economic activities, and scope for future development. The towns are classified based on their predominant economic functions:

Town	Primary Function	Distance from Indore
Pithampur	Industrial Hub	32 km
Dewas	Manufacturing & Connectivity	35 km
Sanwer	Agriculture & Tourism	40 km

3. Town Profiles

i) Pithampur

Distance from Indore: 32 km
Town/City Area: 84 sq.km
Population: 126,200 (Town), 183,000 (City)
Economic Characteristics: Pithampur is a prominent industrial hub characterized by its well-developed industrial parks and proximity to Indore. The economy is primarily focused on manufacturing and logistics. Its infrastructure supports large-scale industrial activity, making it a key driver of regional industrial growth.
Government-supported infrastructure and its SEZ further enhance its strategic value.

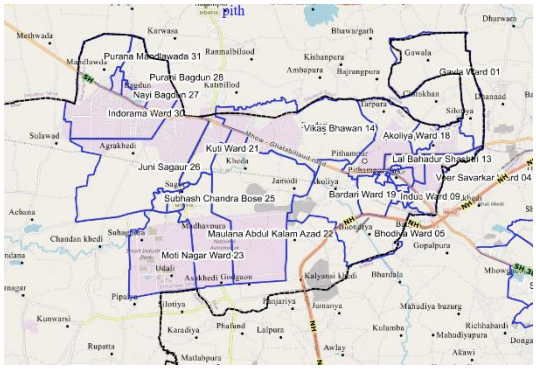

Figure 19 Map of Pithampur

ii) Dewas

Distance from Indore: 35 km
Town/City Area: 76.6 sq.km
Population: 289,550 (Town), 421,000 (City)
Economic Characteristics: Dewas has a diverse and expanding industrial base, with a significant number of manufacturing units. Additionally, the town is known for its agricultural output, making it a balanced economy with both industrial and agricultural contributions. Its connectivity and infrastructure support further economic expansion.

Figure 20 Map of Dewas

iii) Sanwer

Distance from Indore: 40 km
Town/City Area: 12 sq.km
Population: 16,150 (Town), 23,000 (City)
Economic Characteristics: Sanwer is predominantly agricultural with emerging small-scale industries. While its industrial base is not as developed as Pithampur or Dewas, its proximity to Indore offers potential for commercial activities. The town also has prospects in rural tourism and agro-based industries. Although Limited urban area and industrial infrastructure reduce its immediate potential for large-scale urban expansion.

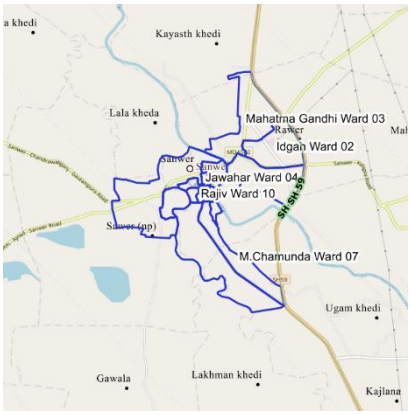

Figure 21 Map of Sanwer

1.8 Analysis of Potential Satellite Towns for Indore

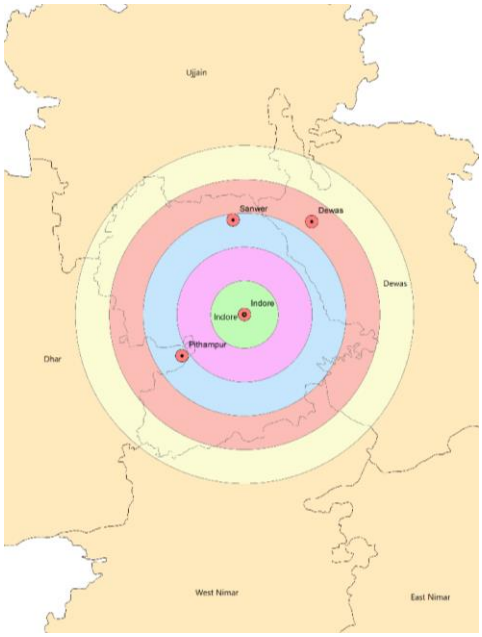

Figure 22 Buffer Map of Indore With Potential Satellite Towns

The map illustrates the regional spatial relationship and influence zones of Indore with respect to its surrounding settlements, including Pithampur, Dewas, Sanwer, and Ujjain. The concentric rings represent distance-based buffers extending outward from the core of Indore city, effectively depicting its metropolitan influence.

Pithampur, located to the southwest of Indore, falls within the 30 km ring, indicating its strategic proximity and integration within Indore's. Similarly, Dewas and Sanwer fall within close proximity >35 and 40 km range.

This spatial framework supports the rationale for treating Pithampur as a **growth center and satellite town**, given its direct accessibility to Indore and alignment with major transportation corridors.

1.9 Evaluation of Potential Satellite Towns for Indore

To facilitate balanced regional growth, the identification and development of satellite towns around Indore is a critical strategy. A comparative assessment of **Pithampur**, **Dewas**, and **Sanwer** has been carried out based on key development parameters, growth trends, land availability, and strategic potential. The table below summarizes the findings:

Town Name	Distance from Indore (km)	Population (2024)	Growth Rate (%)	Municipal Area	Available Expansion Land	Development Parameters	Strategic Advantages	Suitability for Satellite Town
Pithampur	32	1,83,000	8.5	84 sq.km	55.5 sq.km	Industrial hub, SEZ, road connectivity	Strong industrial ecosystem, direct highway connectivity	**Highly Suitable for Primary Satellite City Development**
Dewas	35	4,20,000	7.8	76.6 sq.km	30–32 sq.km	Industrial zone, pharma hub, rail connectivity	Established industry, pharma base	**Moderately Suitable**
Sanwer	40	45,000	5.8	12.5 sq.km	6 sq.km	Agriculture, textile, heritage potential	NH-3 location, water access	**Potentially Suitable for Specialized Development**

Table 6 Evaluation of Potential Satellite Towns

1.10 Analysis and Justification : Why Pithampur?

- **Industrial Strength**

Pithampur is home to over **1,360 hectares** of developed industrial land and has a well-established base in manufacturing and logistics. Its inclusion in the **Delhi-Mumbai Industrial Corridor (DMIC)** adds significant strategic and financial backing.

- **Employment and Economic Output**

Generating employment for over **55,000 people**, the town supports skilled and unskilled labor, making it a driver for regional economic stability and job creation.

- **Population Growth and Urban Expansion**

Pithampur has seen a nearly **10-fold increase in population** from 11,980 in 1980 to 1,26,200 in 2011, and further to an estimated **1.83 lakh in 2024**, with a **growth rate of 8.5%**—the highest among the three towns.

- **Connectivity**

Strategically located on **NH-47 and NH-52**, Pithampur provides direct highway connectivity to Indore and nearby industrial zones. Public transport ensures commuter ease.

- **Land Availability**

With **55.5 sq.km of expansion land**, Pithampur has the highest potential for accommodating new residential and commercial developments.

- **Policy and Infrastructure Support**

Supported by national infrastructure programs and housing **Asia's longest automotive testing track (NATRAX)**, Pithampur is primed for large-scale infrastructure development.

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i) Inference

After comparing economic functions, infrastructure, demographic growth, and development potential:

- **Sanwer**, while promising for niche agro-tourism and rural industries, lacks scale and infrastructure.
- **Dewas** has strong potential as a complementary satellite town due to its industrial diversity but is limited in land availability and policy integration.
- **Pithampur**, with its unmatched combination of industrial capacity, land availability, infrastructure, and policy support, is the **most suitable candidate for development as a Primary Satellite City** to Indore.

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ii) Conclusion

Pithampur's **proximity to Indore**, **robust industrial base**, **employment generation**, **strategic policy integration**, and **expansion capacity** make it the most viable option for structured satellite town development. It is poised to facilitate **urban decentralization**, **economic diversification**, and **balanced regional development** for the Indore Metropolitan Region.

1.11 Pithampur Town Analysis

Based on the evaluation, **Pithampur** emerges as the most suitable town for development as a **Primary Satellite City** due to its strong industrial foundation, availability of land, and excellent connectivity.

Key Attributes and Figures

Factor	Analysis	Figures
Proximity to Indore	Facilitates easy commuting	30 km from Indore
Established Industrial Hub	Major industrial zone with a variety of sectors	1,360.82 hectares of industrial area
	Home to key manufacturing industries	Force Motors, Eicher Motors, Hindustan Motors
Employment Generation	Major source of skilled and unskilled employment	~55,000 jobs in industrial sector
Population Growth	Rapid urbanization due to industrialization	From 11,980 (1991) to 1,26,200 (2011)
Connectivity & Transport	Connected via national highways and public transport	NH-47, NH-52, 1 hr 26 mins by bus
Land Availability	Sufficient land parcels for urban expansion	55.5 sq.km of expansion area
Government Initiatives	Backed by national development programs	Part of Delhi-Mumbai Industrial Corridor (DMIC)
Special Infrastructure	Automotive testing facilities	Asia's longest automotive test track (11.3 km), NATRAX

Table 7 Analysis of Pithampur Town

i) Strategic Strengths

- **Industrial Strength**: Pithampur has a well-established ecosystem with large-scale industries and an SEZ, contributing to both local and regional economic development.
- **Connectivity**: National highways and public transport routes provide robust linkages with Indore and surrounding regions.
- **Growth Potential**: The availability of expansion land and continuous population growth indicate high potential for sustainable urban development.
- **Policy Support**: Integration into national industrial corridors (like DMIC) enhances investment prospects and infrastructure funding.

ii) Inferences

Given its strategic location, strong industrial base, infrastructure readiness, and planned land availability, **Pithampur is highly suitable for development as a primary satellite town to Indore**. It can effectively support population decentralization, employment generation, and regional economic diversification.

6. Analysis and Interpretation of Data

1.1 Pithampur – Background and Regional Significance

1.2 Introduction to Pithampur

Figure 24 Pithampur Location

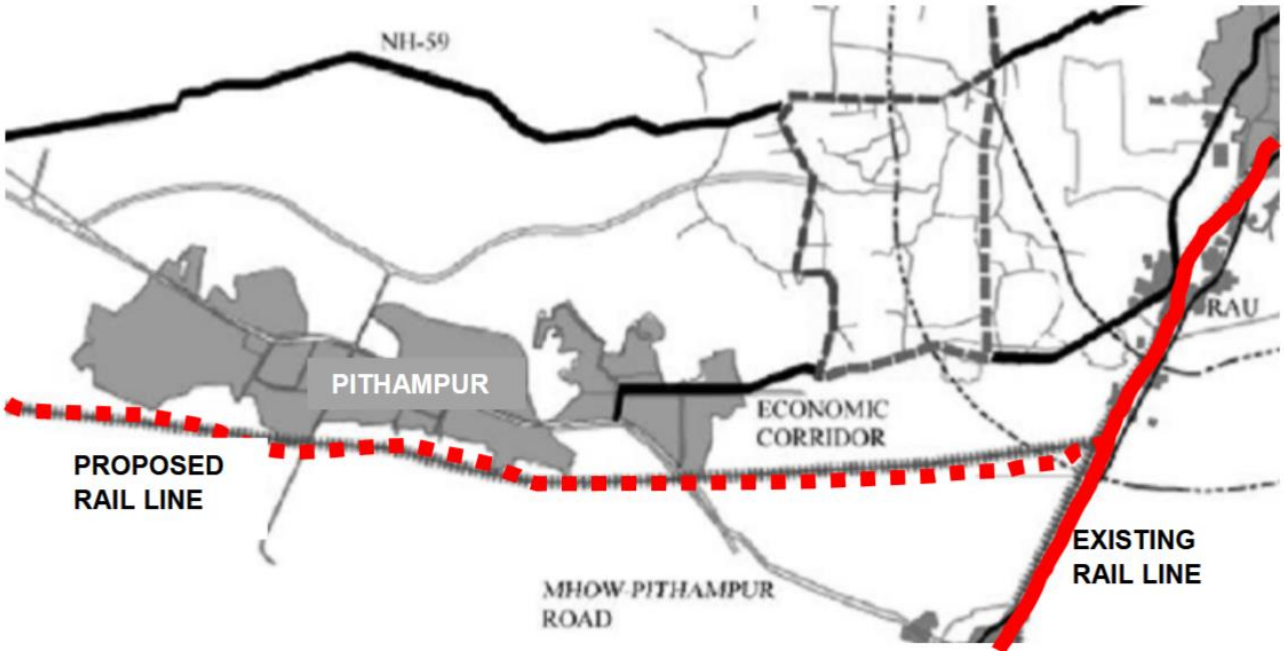


Figure 23 Surrounding Context of Pithampur

Pithampur, located at 23°25’ N latitude and 77°35’ E longitude, is a town and municipal body in the Dhar district of Madhya Pradesh. It is well-known as a prominent industrial estate and suburban extension of Indore, situated just 22 km away via Rau and 8 km from Mhow. Due to its close proximity to Indore, Pithampur benefits from access to the city’s airport, which is on the path to becoming an

international hub.
The town boasts excellent road connectivity, as it lies along key transport corridors linking National Highways NH 59 (Indore–Ahmedabad) and NH 3 (Mumbai–Agra), and it also has access to NH 79 towards the northwest. Although currently without a rail line, Pithampur is slated for railway connectivity in the near future.
A significant economic center for Madhya Pradesh, Pithampur has evolved into a manufacturing hub, particularly for the automobile industry. The area hosts both domestic and international automotive manufacturers, and it has been earmarked by the Government of India for a National Automotive Testing and R&D Infrastructure Project (NATRiP). It is regarded as the second-largest industrial estate in Asia.
Pithampur is also equipped with a dry port managed by Container Corporation of India Ltd. (CONCOR), which enables direct export of goods with all necessary formalities processed locally. Additionally, it is designated as a key Investment Region within the proposed Delhi-Mumbai Industrial Corridor (DMIC), enhancing its industrial importance.
The Urban Local Body (ULB) of Pithampur governs an area of 90 sq. km, which includes the 35 sq. km AKVN (Audhyogik Kendra Vikas Nigam) industrial township and 55 sq. km of additional land spread over a linear stretch of 17 km. The industrial zones are organized into three primary sectors.

1.3 State Context – Madhya Pradesh

i) Overview

Madhya Pradesh, centrally located in India, spans an area of 308,252 sq. km and has a population of around 60 million. It was the largest Indian state until November 1, 2000, when Chhattisgarh was carved out as a separate state. MP shares its borders with Rajasthan, Gujarat, Uttar Pradesh, Maharashtra, and Chhattisgarh

Figure 25 Madhya Pradesh and Adjoining states

ii) Geographical Features

The state acts as a transitional belt between the fertile Gangetic plains in the north and the arid Deccan plateau in the south. It is part of the Peninsular Plateau of India, located in its north-central region, with an average elevation of 600–900 meters. The Narmada-Son Valley, stretching east to west, dominates the state's topography. MP also contains 31% of India's total forest area, making it the state with the largest forest cover in the country.

iii) Economic Profile

Madhya Pradesh is richly endowed with mineral resources, including coal, diamonds, limestone, and methane. It ranks among the top four states in India for attracting investments. In 2007–08, its Gross

State Domestic Product (GSDP) was ₹1,23,230 crore at current prices. However, the per capita Net State Domestic Product (PCNSDP) was ₹18,051—only about half the national average at the time. Its PCNSDP growth rate of 6.97% also lagged behind the national average of 12.73%, indicating continued economic challenges and widespread poverty.

The state has introduced several policy initiatives to attract investment and boost industrial growth. A key instrument is the Madhya Pradesh Audyogik Kendra Vikas Nigam (MPAKVN), which has developed industrial clusters in regions like Bhopal, Gwalior, Jabalpur, Rewa, and Indore. Of special relevance is the Indore AKVN, which encompasses the Pithampur Industrial Region, providing pre-established infrastructure for industries.

Additionally, Madhya Pradesh has launched other sector-specific policies, including:

- **IT Policy (2006)**
- **Biotechnology Policy (2003)**
- **SEZ (Special Economic Zone) Policy**
- **Tourism Promotion Policy**
- **Power Sector Policy**

Pithampur, under the Indore AKVN cluster, is a focal point for industrial growth in the state. The Union Government has approved the development of an Automotive Cluster in Pithampur with financial support amounting to ₹51.4 crore. Other developmental priorities of the state include establishing Agri Export Zones (AEZs), promoting eco-tourism and heritage tourism, and ensuring sustainable mineral resource extraction.

1.4 District Context

1.5 General Overview

The focus area of this study lies within **Dhar district**, which is part of the **Indore Division**, one of ten administrative divisions in Madhya Pradesh. Geographically located in the western part of the state, Dhar district spans an area of **8,153 square kilometers**. It is administratively divided into seven tehsils: **Dhar, Badnawar, Dharampuri, Sardarpur, Manawar, Kukshi,** and **Gandhwani**. The town of **Dhar** serves as both the district and tehsil headquarters, making it a key administrative center.

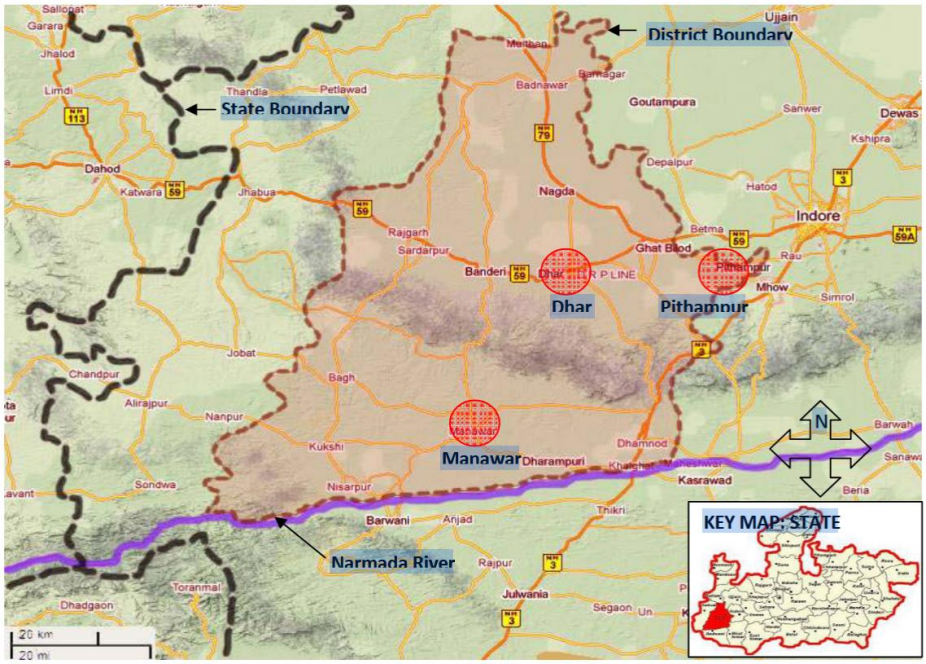


Figure 26 Dhar District showing Reference Towns, Connections, Natural Features

As per the **2001 Census**, the district had a population of **1,740,577**, registering a significant decadal growth rate of **27.29%** between 1991 and 2001.

1.6 Urban Development Context

Dhar district comprises **three Nagar Palikas (municipal councils)** and **eight Nagar Panchayats (town councils)**. These include urban centers such as **Badnawar, Rajgarh, Sardarpur, Mandav, Dhamnod, Dharampuri, Dahi**, and **Kukshi**. However, the **urbanization rate** of the district was only **16.56%** in 2001, considerably lower than the **state average of 26.5%**. This disparity suggests inadequate employment opportunities and limited urban development.

The **population density** of the district stood at **213 persons per square kilometer**. It contained a total of **6,438 habitations**, including **1,487 inhabited villages**, **14 forest villages**, and **9 urban towns**. A distinctive feature of Dhar district is the contrasting urbanization pattern within its territory. The **northern region**, forming part of the **Malwa Plateau**, borders the more urbanized districts of **Ratlam, Ujjain**, and **Indore**. In contrast, the **southern region**, which lies in the **Narmada Valley**, shares its boundaries with the less urbanized districts of **Jhabua** and **Barwani**. This creates a noticeable spatial imbalance in development and urban growth within the district.

1.7 Expected Urban Growth in the Region

Pithampur is strategically positioned at the intersection of both state and national industrial development policies, which strongly suggests that the region is on the cusp of significant urban expansion and transformation.

i) Delhi–Mumbai Industrial Corridor (DMIC)

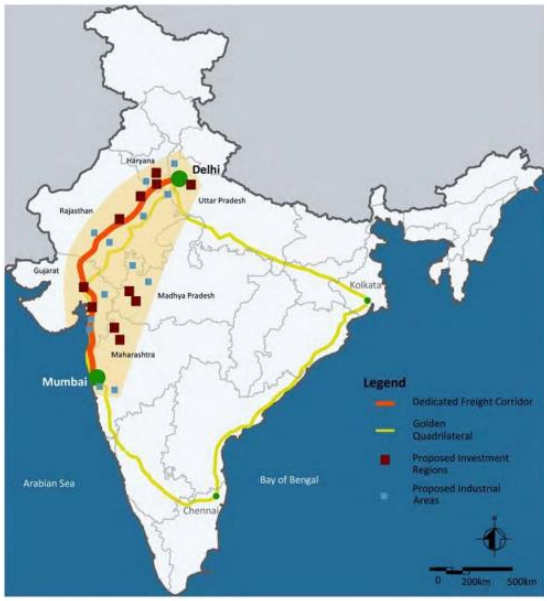


Figure 28 Delhi Mumbai Industrial Corridor - India

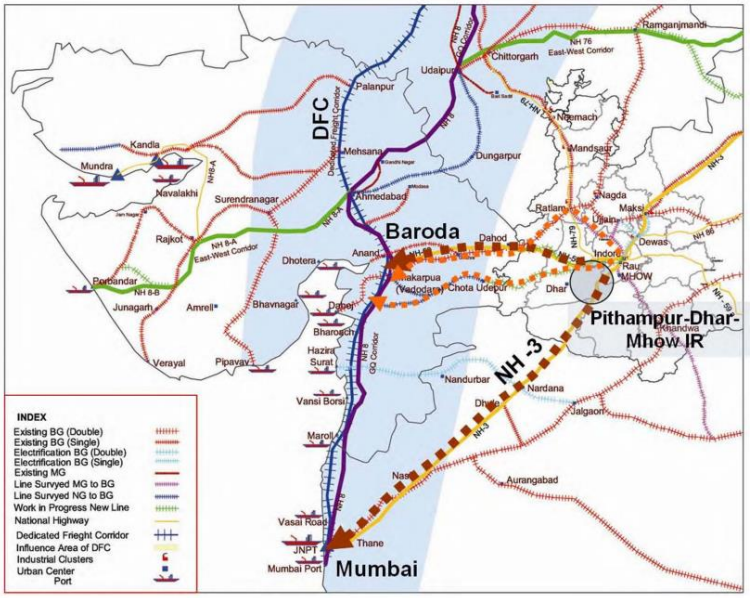


Figure 27 DMIC Influence Area

The **DMIC** is envisioned as a world-class industrial corridor adhering to international standards, with a focus on fostering a strong manufacturing and service-based economy. Within this framework, the **Dhar–Pithampur–Mhow belt** has been designated as **Investment Region 6** (refer to Figures 1.5 and 1.6). This zone is one of the **six nodes prioritized for implementation under Phase I (2008–2012)** of the DMIC project.

Key components planned for this region under DMIC include:

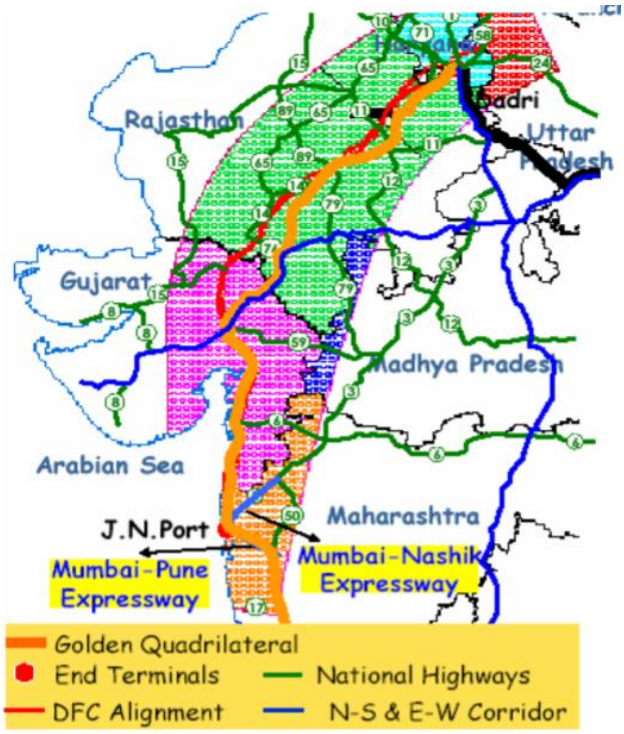


Figure 29 DMIC Project - Road Network

- Development of **dedicated rail connectivity**
- Establishment of **captive power generation plants**
- Implementation of **environmental safeguards**
- Integrated planning for **residential, commercial, and institutional infrastructure**

These provisions aim to create a robust investment-friendly environment and support long-term sustainable growth.

ii) Indore AKVN

On the state level, **Indore Audyogik Kendra Vikas Nigam (AKVN)** has played a central role in driving industrial development, especially in and around Pithampur. Formed in **1982**, the AKVN has developed **2,492 hectares** of industrial land by **2007**, with **1,431 industrial plots** already allotted. Specialized infrastructure facilities created under AKVN in the region include:

- A **Special Economic Zone (SEZ)**
- The **Crystal IT Park**
- A **Food Park**
- An **Apparel Park**

Due to its growing prominence in the automobile sector, **Pithampur has earned the nickname "Detroit of India"**. Notably, the town has witnessed a **remarkably high population growth rate in the past decade**, indicating a substantial level of **in-migration**, largely driven by employment opportunities and industrial expansion.

iii) Indore–Pithampur Economic Corridor

The Indore–Pithampur Economic Corridor is a transformative infrastructure project spearheaded by the Madhya Pradesh Industrial Development Corporation (MPIDC). This corridor is set to dramatically reshape the economic and urban landscape of the region by integrating industrial and residential zones, thereby accelerating both investment and employment.

1.8 Strategic Land Development

According to recent reports, a 300-meter-wide strip of land on both sides of the proposed corridor road will be earmarked as a dedicated Investment Region. This zone is planned to accommodate a diverse range of economic activities, including:

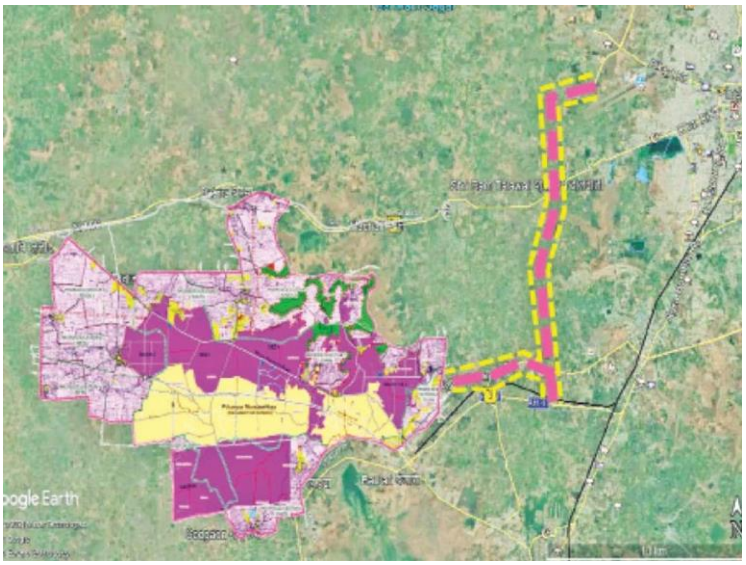


Figure 30 Location of the Corridor

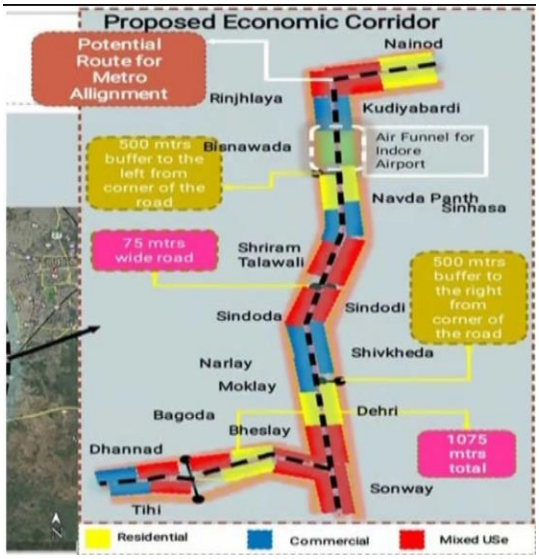


Figure 31 Influence Area f Indore Pithampur Economic Corridor

- Hospitality and Tourism Infrastructure (such as hotels)
- Green and Sustainable Industries
- Sports Complexes
- Commercial Hubs

The initiative is projected to attract investment exceeding ₹20,000 crore, making it one of the largest economic undertakings in the region.
Given the industrial variety and scale of development, the corridor is expected to generate nearly 1 lakh job opportunities across multiple sectors. This influx of employment is anticipated to draw significant in-migration and enhance the overall socio-economic profile of the region.

To complement the industrial zones, the development plan also includes the establishment of residential clusters along the corridor. This integrated land use strategy ensures that the workforce will have access to quality living spaces in close proximity to their places of employment, thereby improving productivity and quality of life.

The total area required for the project is approximately 1,100 hectares. The MPIDC has stated that landowners and farmers whose land falls within the designated corridor will be offered fair compensation in the form of monetary reimbursement or developed land plots in alternate locations, based on their preference.

1.9 Corridor Design and Connectivity

The corridor spans a total length of 19.6 kilometers, with a 75-meter-wide central roadway, flanked by 300-meter-wide buffer zones on either side. It is designed to link Nainod in Indore to Somwaliyā near Dhanbad Dryport. This corridor will serve as a critical logistics and mobility spine, significantly reducing travel time between Indore Airport, Pithampur Industrial Area, and other regional hubs. It is also expected to boost the seamless flow of goods, services, and people, facilitating greater regional integration and competitiveness.

1.10 Pithampur – Town Profile

1.11 Pithampur – Administrative and Urban Jurisdiction

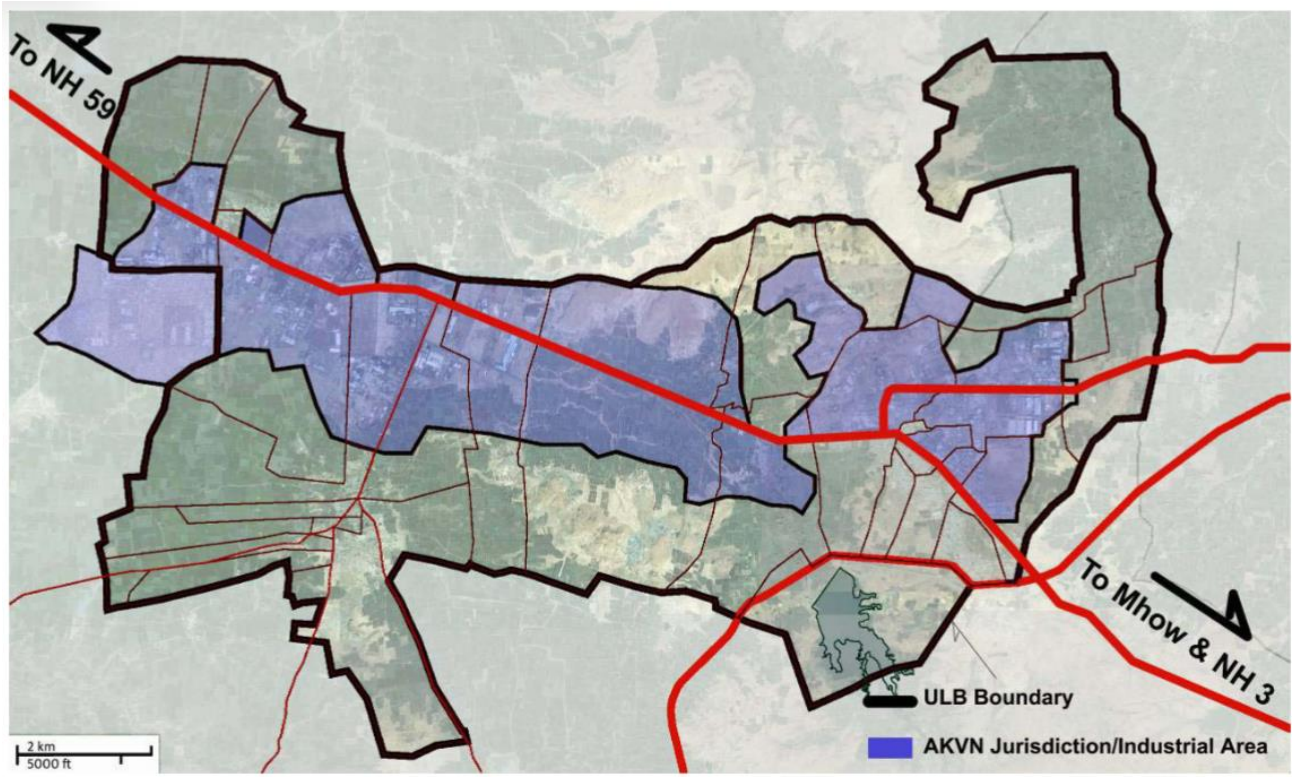


Figure 32 Pithampur Municipal showing Industrial Area

Pithampur functions as a **Nagar Palika Parishad (Municipal Council)** under the **Urban Local Body (ULB)** governance framework. The town is spread over approximately **84 square kilometers**, out of which around **35 square kilometers** are occupied by the **AKVN (Audyogik Kendra Vikas Nigam) Industrial Township**, and the remaining **55 square kilometers** extend linearly over a **17-kilometer stretch**, encompassing industrial, residential, and institutional zones.

The **municipal governance structure** of Pithampur is divided into **31 municipal wards**, each represented by elected councilors who are responsible for local civic administration, infrastructure maintenance, sanitation, water supply, and urban amenities within their respective areas. These wards collectively represent the varied character of the town—ranging from industrial estates to residential colonies and commercial markets.

1.12 Industrial Significance

Pithampur is known for hosting a wide array of national and international industrial units, particularly in the **automobile, engineering, pharmaceuticals, textile, and chemical sectors**. It is often referred to as the "**Detroit of India**" due to its high concentration of automobile industries. The town is home to several prominent industrial companies, including those operating under the Special Economic Zone (SEZ) policy and benefiting from **Indore AKVN's** infrastructure development.
Additionally, the town features a **Dry Port facility**, operated by **CONCOR (Container Corporation of India Ltd)**, allowing direct export of finished goods with customs clearance, thus making

Pithampur an essential node in the global supply chain.

The town houses two major industrial zones that contribute immensely to its economic landscape: the **Developed Industrial Park (Sector 1 & 2) and the Special Economic Zone (SEZ Phase 1 & 2).**

i) Developed Industrial Park (Sector 1 & 2)

The Pithampur Industrial Park, particularly Sectors 1 and 2, is the largest developed industrial area in Madhya Pradesh. Spread over 793.91 hectares, this park is fully occupied, reflecting the high demand and success of industrialization in the region. It is a multi-product industrial park that hosts a variety of manufacturing units ranging from automotive to engineering, supported by comprehensive infrastructure. Notable companies operating here include Force Motors, Mahindra & Mahindra, and CG Power, among others. The availability of piped natural gas through GAIL and a dedicated water supply system sourced from the Narmada River ensures uninterrupted industrial operations. The area also benefits from reliable power supply, street lighting, and access to warehousing facilities. Additionally, inland container depots situated within 11 km enhance the logistics efficiency of the park. With an investment volume of ₹5568.59 crore and employment generation for over 19,800 people, this industrial park serves as a backbone for regional economic activity.

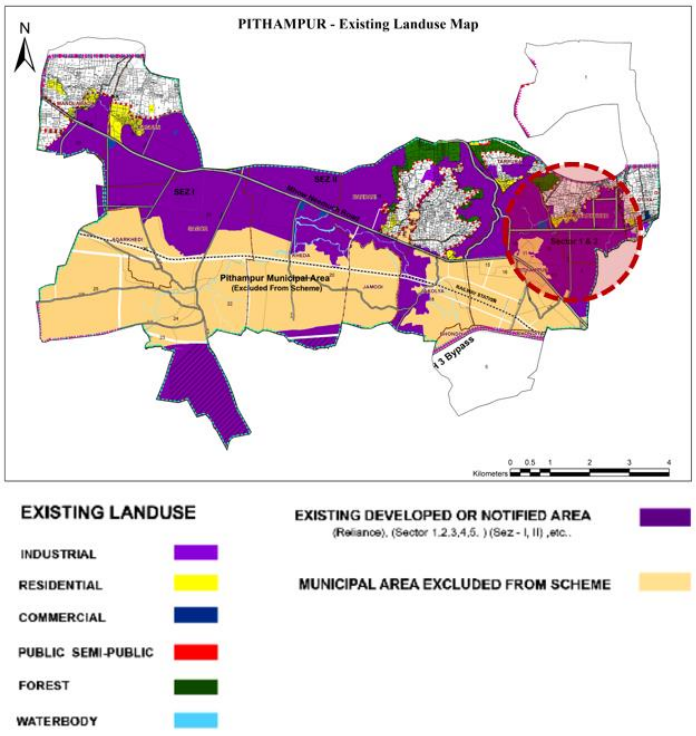


Figure 34 Location of Developed Industrial Park - Sector 1 & 2

ii) Special Economic Zone (SEZ Phase 1 & 2)

Complementing this is the Special Economic Zone (SEZ), which is India's first operational greenfield SEZ, also located in Pithampur. The SEZ spans 569.33 hectares and has been developed in phases. Phase I and II house the processing units, while the non-processing area of Phase II remains undeveloped. Like the industrial park, the SEZ is a multi-product hub, but with a strong presence of pharmaceutical and biotech industries. It is home to some of India's leading pharmaceutical companies such as Cipla, Lupin, Alkem, and IPCA

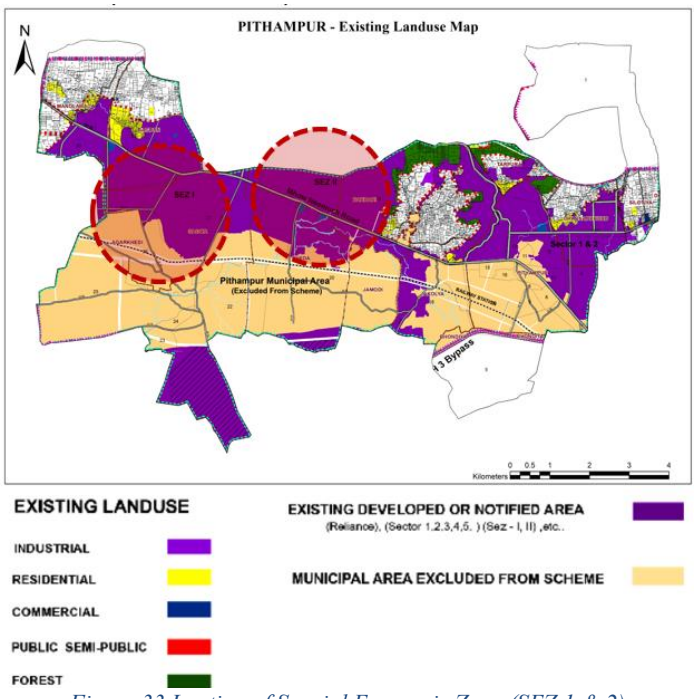


Figure 33 Loation of Special Economic Zone (SEZ 1 & 2)

Laboratories. The SEZ is equipped with essential infrastructure, including power, water, road access, and container depots, and is well-connected to ports like Jawaharlal Nehru Port in Mumbai and Kandla Port in Gujarat. With a total investment of ₹7400 crore and employment provided to over 23,000 people, the SEZ plays a critical role in both industrial output and job creation.

Together, these two industrial zones illustrate the industrial might of Pithampur. Their integration with supporting clusters such as Sectors 3, 5, 6, Kheda, and IT and garment parks, further consolidates Pithampur's status as a key industrial satellite town of Indore. The industrial base not only contributes significantly to the regional economy but also positions Pithampur as a national hub for manufacturing and exports.

1.13 Connectivity and Infrastructure

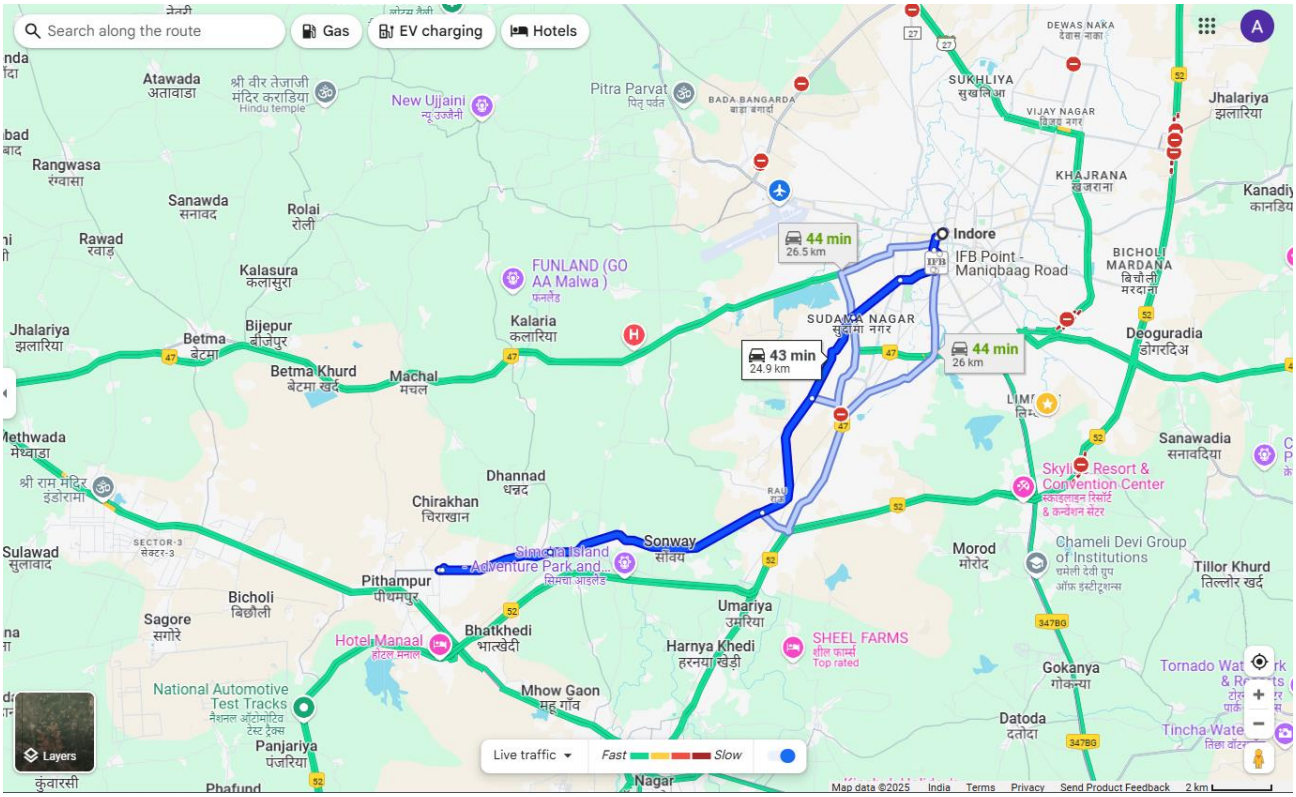


Figure 35 Connectivity to Pithampur

i) Proximity to Indore

Pithampur enjoys excellent **road connectivity** through national and state highways. With the upcoming **rail link** and its position along the proposed **Indore–Pithampur Economic Corridor**, the town is poised for significant infrastructural and economic upgrades. The corridor aims to transform the area into a global investment destination, ensuring high-quality residential and commercial development alongside industrial zones.

The **Delhi–Mumbai Industrial Corridor (DMIC)** also identifies the **Dhar–Pithampur–Mhow belt** as an **Investment Region**, with planned infrastructure including **captive power generation, logistics hubs, institutional campuses, and eco-friendly industries**.

ii) Road Connectivity

Road connectivity further enhances Pithampur's strategic advantages. The Rau–Pithampur Road (MP SH-27) serves as a major arterial route connecting the industrial town to Indore. In addition, national

highways NH-52 (earlier NH-3) and NH-47 pass nearby, ensuring seamless vehicular movement across regional and national destinations. Importantly, Pithampur is situated within the Delhi–Mumbai Industrial Corridor (DMIC) Influence Zone. This integration into the DMIC framework underscores Pithampur's significance as a key logistics hub on the national map, linking major production and consumption centers through world-class infrastructure.

iii) Rail Connectivity

In terms of rail connectivity, the nearest railway stations to Pithampur are Mhow, located around 18 kilometers away, and Indore Junction, situated about 30 kilometers from the town. To further bolster transport infrastructure, a proposed Indore–Pithampur Metro Line under Indore Metro Phase-II is expected to significantly improve commute efficiency. Once operational, the metro line will reduce travel time to approximately 20–25 minutes and is anticipated to support the daily movement of a large workforce employed in the industrial zones of Pithampur. This planned enhancement in public transport will not only boost regional connectivity but also contribute to sustainable urban development in the Indore–Pithampur corridor.

1.14 Inferences

1. **Strategic Proximity**
    - Located **22 km from Indore**, leveraging its international airport, commercial resources, and proposed metro connectivity (Indore Metro Phase-II).
2. **Industrial Powerhouse**
    - **"Detroit of India"**: Major automotive hub with Asia's 2nd-largest industrial estate and India's 1st operational SEZ.
    - Hosts global giants (e.g., Mahindra, Cipla) and anchors **DMIC Investment Region 6**, attracting ₹12,968+ crore investments and generating 42,800+ jobs.
3. **Transformative Infrastructure**
    - **Indore-Pithampur Economic Corridor**: 19.6-km, 75m-wide highway with 300m buffer zones for industries, housing, and logistics.
    - Upcoming rail link, CONCOR dry port, and NH connectivity (NH 59/3/47) enabling seamless export and supply chains.
4. **Policy-Driven Growth**
    - **DMIC Phase-I Priority Node**: Captive power plants, eco-industrial zones, and institutional campuses.
    - **State Backing**: Indore AKVN's 2,492-hectare industrial land development, SEZ/IT/Apparel Parks.
5. **Urban Expansion Imperatives**
    - **Rapid In-Migration**: High population growth demanding residential clusters, amenities, and sustainable services.
    - **Governance Scale**: Pithampur ULB manages 90 sq. km (31 wards), bridging Dhar district's low urbanization (16.56%).
6. **Critical Synergy**
    - Satellite role as **industrial counter-magnet** to Indore, requiring integrated planning to avoid congestion while scaling as a self-sustaining economic node.

Failure Risk: Unplanned growth could strain infrastructure; **Success Opportunity**: Model sustainable satellite town under Indore's metropolitan umbrella.

1.15 Pithampur Analysis : Existing Scenario

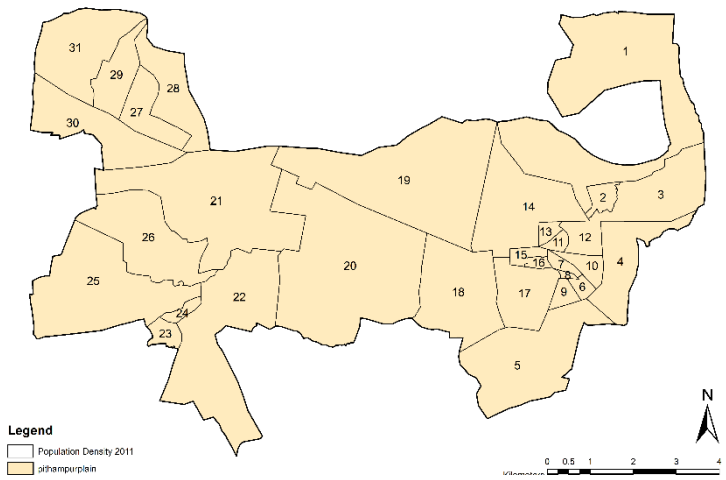


Figure 36 Pithampur - Municipal Wards Map

Pithampur Municipality is administratively organized into **31 wards**, enabling decentralized governance and effective local administration. The spatial distribution of these wards is illustrated in the Pithampur Ward Map.

The **spatial distribution** of wards in the central and eastern regions—such as **wards 6 to 16**—are more compact and clustered, corresponding to higher population densities and more urbanized character. These wards house the core residential and industrial sectors, making them focal points for municipal services, infrastructure demands, and future development interventions.

In contrast, the **western and southern wards**—including **wards 1, 3, 5, 18, 19, 21, 22, 25, and 31**—cover more expansive areas with relatively lower population densities. These peripheral zones often accommodate agricultural land, open spaces, and new industrial setups, offering significant potential for **planned urban expansion and industrial diversification**.

1.16 Demographic Analysis

i) Population Density Analysis (2001–2011)

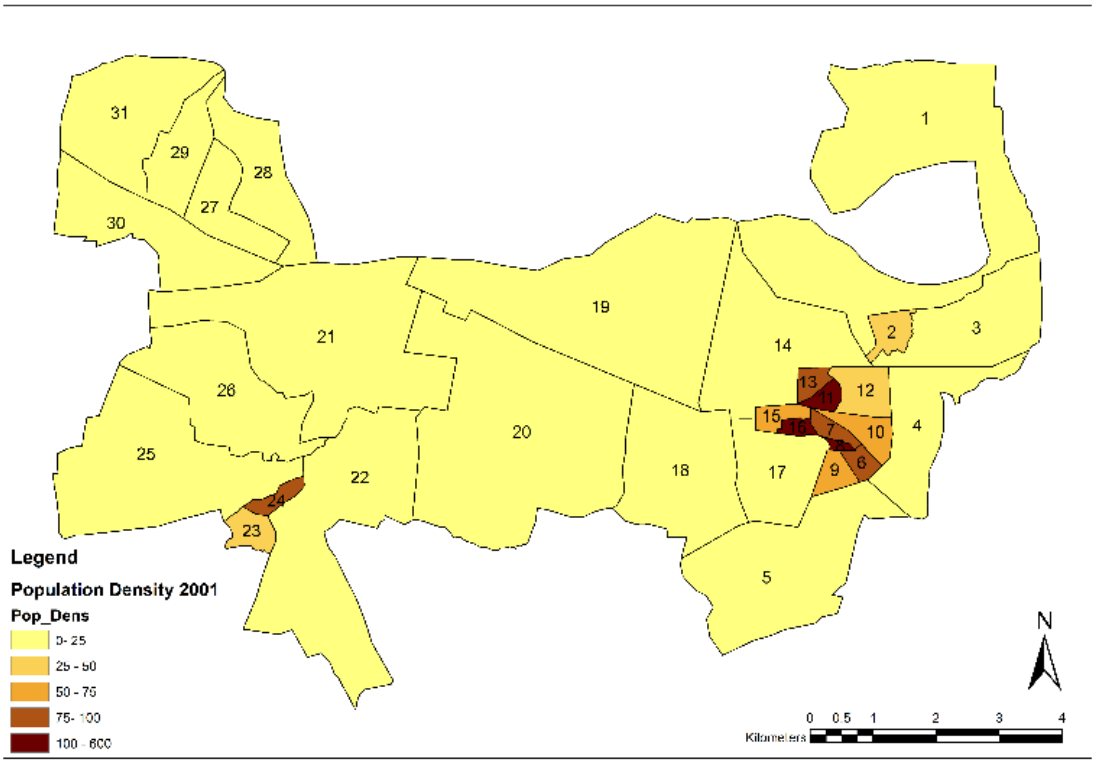


Figure 37 Pithampur Population Density 2001

The **population density maps for the years 2001 and 2011** reveal distinct spatial demographic changes.

In **2001**, the majority of the municipality had a low population density, particularly in peripheral wards like 1, 3, 4, 5, 18, and 19. However, higher density clusters were observed in **wards 10, 12, 15, and 23**, which exceeded 100 persons per hectare, indicating concentrated settlement zones likely influenced by industrial or commercial activity.

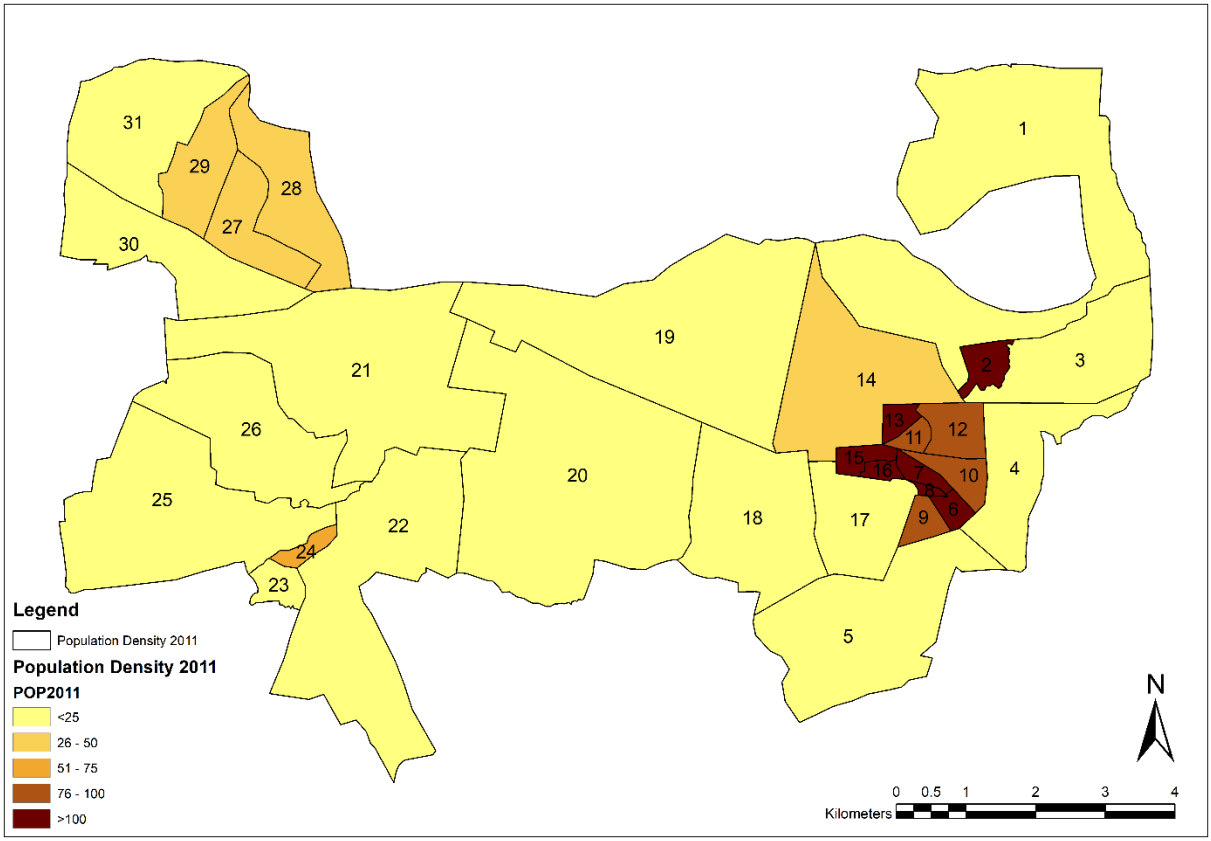


Figure 38 Pithampur Population Density 2011

By **2011**, the trend of densification became more prominent in the central and eastern parts of Pithampur. Wards **6, 7, 9, 10, 11, 12, 13, 14, 15, and 16** emerged as high-density zones (>100 persons/ha), signifying urban consolidation in these areas. Meanwhile, wards like **23** maintained their high-density status, reflecting persistent pressure on local infrastructure and services in these pockets.

ii) Density Categorization

Based on 2011 data, wards were categorized into three density levels:

Density Category	Ward Numbers	Density Range (Persons/ha)
High Density	6, 7, 9, 10, 11, 12, 13, 15, 16	>100
Medium Density	2, 14, 17, 24, 28, 27	51–100
Low Density	1, 3, 4, 5, 18, 19, 20, 21, 22, 23, 25, 26, 29, 30, 31	0–50

- **High Density (>100 persons/ha):** Wards 6, 7, 9, 10, 11, 12, 13, 14, 15, 16
- **Medium Density (51–100 persons/ha):** Wards 2, 14, 17, 24, 28, 27
- **Low Density (0–50 persons/ha):** Wards 1, 3, 4, 5, 18, 19, 20, 21, 22, 23, 25, 26, 29, 30, 31

This classification highlights areas requiring differentiated urban management strategies, especially in high-density zones

where the need for infrastructure upgradation is critical.

iii) Population Projection

Year	Arithmetic Projection	Geometric Projection	Incremental Projection
2001	68,044 (Actual)		
2011	126,200 (Actual)		
2025	207,618	265,774	205,101
2035	265,774	323,930	286,584
2045	323,930	432,992	368,067

Table 8 Population Projection for Pithampur

- **Arithmetic Mean Method**

The arithmetic method estimates future population by adding a fixed average increase per decade. The formula is:

Pt = Po + m × Δt

Where:

- *Pt* = Projected Population
- *Po* = Latest Population
- *m* = Average Increase
- *Δt* = Number of Periods

This method is best suited for **large, established cities with steady growth**. It often underestimates future population in **smaller or rapidly developing towns**, as it assumes linear growth.

- **Geometric Mean Method**

This method projects population assuming **compound growth**, where the rate of increase is proportional to the current population. The formula is:

Pt = Po × (1 + r)^n

Where:

- *r* = Growth Rate
- *n* = Number of Periods

It tends to give **higher population estimates** and is suitable for **new industrial towns** with high growth potential in the early years of development. It reflects real-world growth dynamics better than the arithmetic method for emerging towns.

- **Incremental Increase Method**

This method refines the arithmetic method by factoring in the **increasing trend in population growth**. It considers both the average increase and the average **increment of the increase**. The formula is:

Pn = Po + n×x̄ + ((n(n+1))/2) × ẏ

Where:

- $\bar{x}$ = Average increase
- $\dot{y}$ = Average incremental increase

It is suitable for **medium-sized towns** where the **rate of population growth is accelerating**, but not as aggressively as in newly industrialized regions.

---

iv) Recommendation for Pithampur

Considering Pithampur's **emerging role as a satellite town to Indore**, its **steady industrial growth**, and **moderate but accelerating urbanization**, the **Incremental Increase Method** is the most suitable for projecting its future population. This method appropriately reflects the **increasing trend in growth** without assuming exponential expansion, making it ideal for preparing long-term plans for infrastructure, utilities, and housing.

From the projection data:

- **Incremental Projection for 2045** = 3.68 lakh
- Compared to **Arithmetic** = 3.23 lakh and **Geometric** = 4.32 lakh

The incremental method offers a **pragmatic middle-ground estimate** that balances optimism with realistic constraints—ideal for guiding sustainable development in Pithampur.

1.17 Topographical and Morphological Analysis of Pithampur

The topographical and morphological characteristics of Pithampur have been studied using key thematic layers: **Slope**, **Aspect**, **Contour**, and **Hillshade**. These maps provide a comprehensive understanding of the terrain features, surface orientation, elevation, and roughness across the region—factors essential for planning infrastructure, drainage, and urban expansion.

i) Slope Analysis

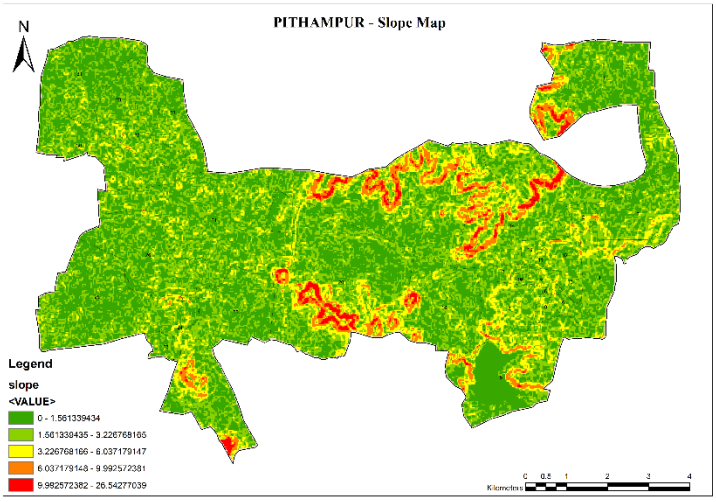


Figure 39 Slope Map of Pithampur

The slope map indicates that approximately **70–75% of Pithampur's area lies in the 0–3° range**, signifying very gentle slopes. These flat terrains are optimal for construction and urban development. About **15–20%** of the area has moderate slopes between 3–6°, while **5–10%** exhibit steeper slopes (>6°), largely concentrated around the **central ridges and southern pockets**. These steeper slopes may present challenges for construction but could be strategically used for green buffers or water retention zones.

ii) Aspect Analysis

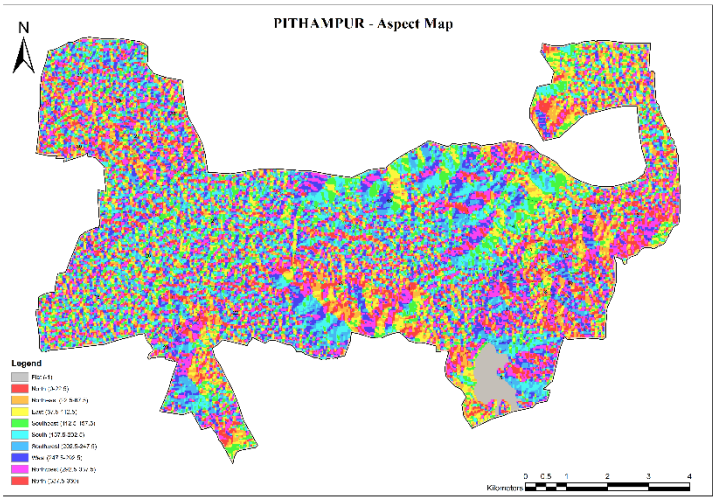


Figure 40 Aspect Map of Pithampur

Aspect refers to the orientation or direction of slopes and is critical for understanding sunlight exposure, microclimate influences, and soil moisture retention. The analysis shows a **heterogeneous distribution** of slope directions throughout the region. However, **southwest, west, and northwest-facing slopes dominate**. These directions are important for planning buildings, especially in terms of optimizing solar access and ventilation. For example, south and southwest-facing slopes receive more sunlight, which can be harnessed for solar energy or be considered for temperature-sensitive development.

iii) Contour Analysis

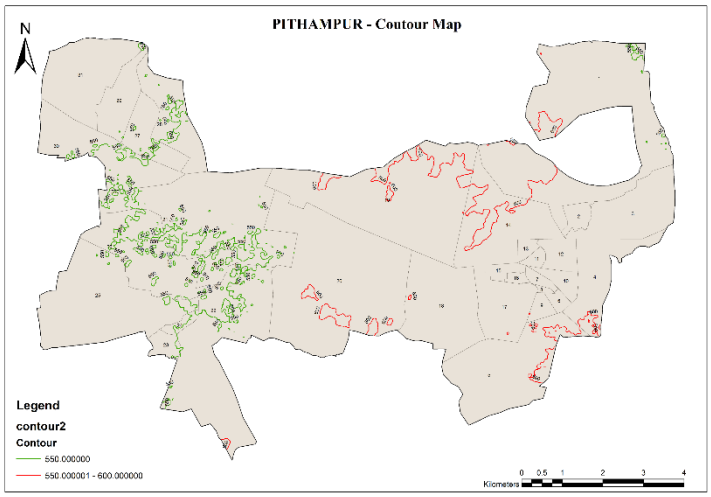


Figure 41 Contour Map of Pithampur

Contours reflect elevation differences and terrain undulations. The elevation in Pithampur ranges between **550m and 600m above sea level**, with higher contours (>580m) concentrated in the **northeastern parts and southern boundary**. The **central region** also displays contour clustering, indicating significant elevation change. These undulating terrains may require careful grading and drainage planning. Higher elevation areas can be explored for public viewpoints or institutional uses, while lower flatlands can be prioritized for residential or industrial development.

iv) Hillshade Analysis

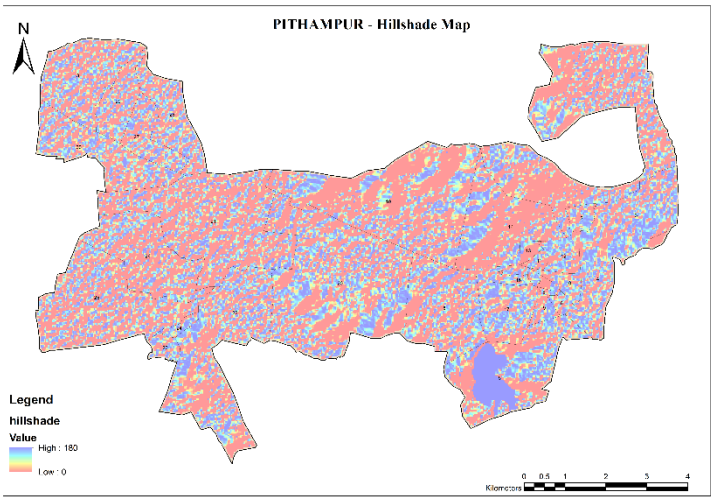
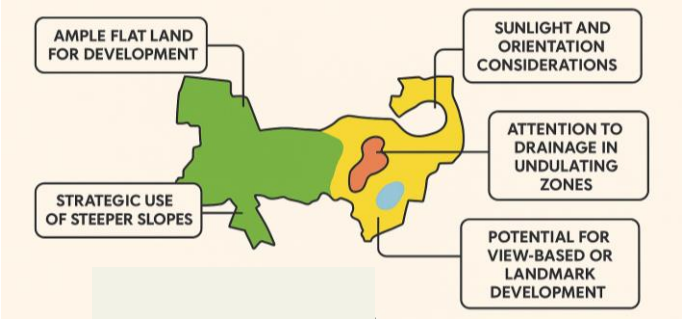


Figure 42 Hillshade Map of Pithampur

The hillshade map visually represents the surface roughness and terrain shadows created by varying elevations. Hillshade values between **0 and 180** reveal the presence of **gentle undulations across most of the region**, particularly in the west and central parts. The map confirms a **predominantly soft terrain** with minor rough patches, making it generally suitable for development without significant terrain alteration. However, steeper and elevated zones, as highlighted in the slope and contour maps, appear more prominently in this layer.

1.18 Inferences


AMPLE FLAT LAND FOR DEVELOPMENT
SUNLIGHT AND ORIENTATION CONSIDERATIONS
ATTENTION TO DRAINAGE IN UNDULATING ZONES
STRATEGIC USE OF STEEPER SLOPES
POTENTIAL FOR VIEW-BASED OR LANDMARK DEVELOPMENT

Ample Flat Land for Development
A large portion of Pithampur—nearly three-quarters—is flat or gently sloping, which is ideal for future urban growth. These areas are well-suited for residential layouts, industrial expansion, and public infrastructure with minimal land modification.

Strategic Use of Steeper Slopes
The steeper slopes observed in the central ridge and southern zones may pose challenges for dense construction. However, these areas could be reserved for open spaces, parks, or ecological buffers to support drainage and preserve natural character.

Attention to Drainage in Undulating Zones
The contour map reveals some variations in elevation, especially in the central and southeastern parts. These undulating areas may need more detailed drainage planning to avoid waterlogging or erosion during heavy rains.

Potential for View-Based or Landmark Development
Higher elevation pockets in the northeast and along the southern boundary offer opportunities for special-purpose developments—like public buildings, temples, or viewpoints—where natural height can be used to enhance visibility and identity.

1.19 Road Network Analysis

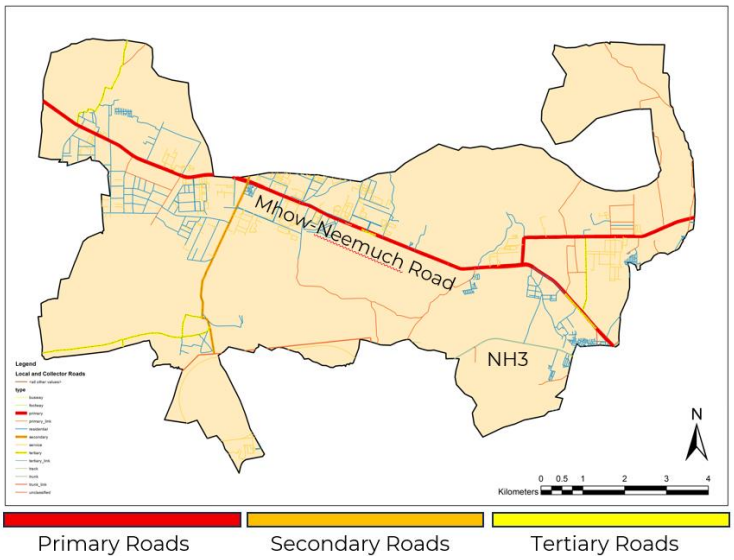


Figure 43 Pithampur Road Hierarchy Map

The road network of Pithampur is characterized by a clear hierarchy, with two primary roads — **Mhow-Neemuch Road (SH-27)** and **NH-52 (Indore–Mumbai Highway)** — forming the main arteries of regional and intra-urban movement. The **Mhow-Neemuch Road** acts as the central spine traversing industrial zones, while **NH-52** supports strategic connectivity to regional urban centers, particularly Indore and Mumbai. **Secondary and tertiary roads** predominantly comprise **local industrial connectors**, ensuring movement within industrial zones and providing service access to housing colonies.

i) Accessibility and Coverage

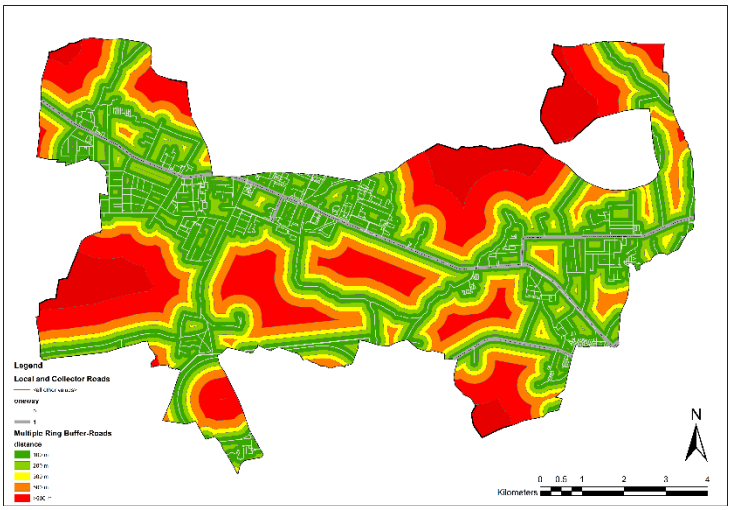


Figure 44 Road Buffer Map

The **Road Buffer Map** indicates that most of urbanized Pithampur lies within **100–300 meters** of major roads, suggesting relatively good accessibility in core areas. However, peripheral zones — particularly **northern, southern, and central areas** — lie beyond **500 meters** from major roads, creating **gaps in last-mile connectivity** and lowering accessibility for both industrial operations and residential mobility.

ii) Inferences for Planning Proposals

- **Enhance Internal Connectivity**: Development of **additional secondary and tertiary roads** in central and peripheral pockets is essential to bridge existing buffer gaps and support equitable access.

- **Focus on Peripheral Road Expansion**: The red-highlighted outer zones (>500m) need targeted infrastructure expansion to bring them within optimal access distance.
- **Integrate with Land Use**: Future land use proposals should align with road hierarchy and buffer coverage to ensure effective circulation and logistic flow.
- **Strengthen Strategic Corridors**: Improvements along SH-27 and NH-52 should prioritize traffic decongestion, signal optimization, and multimodal integration to maintain regional connectivity.

1.20 Land Use Land Cover (LULC) Analysis

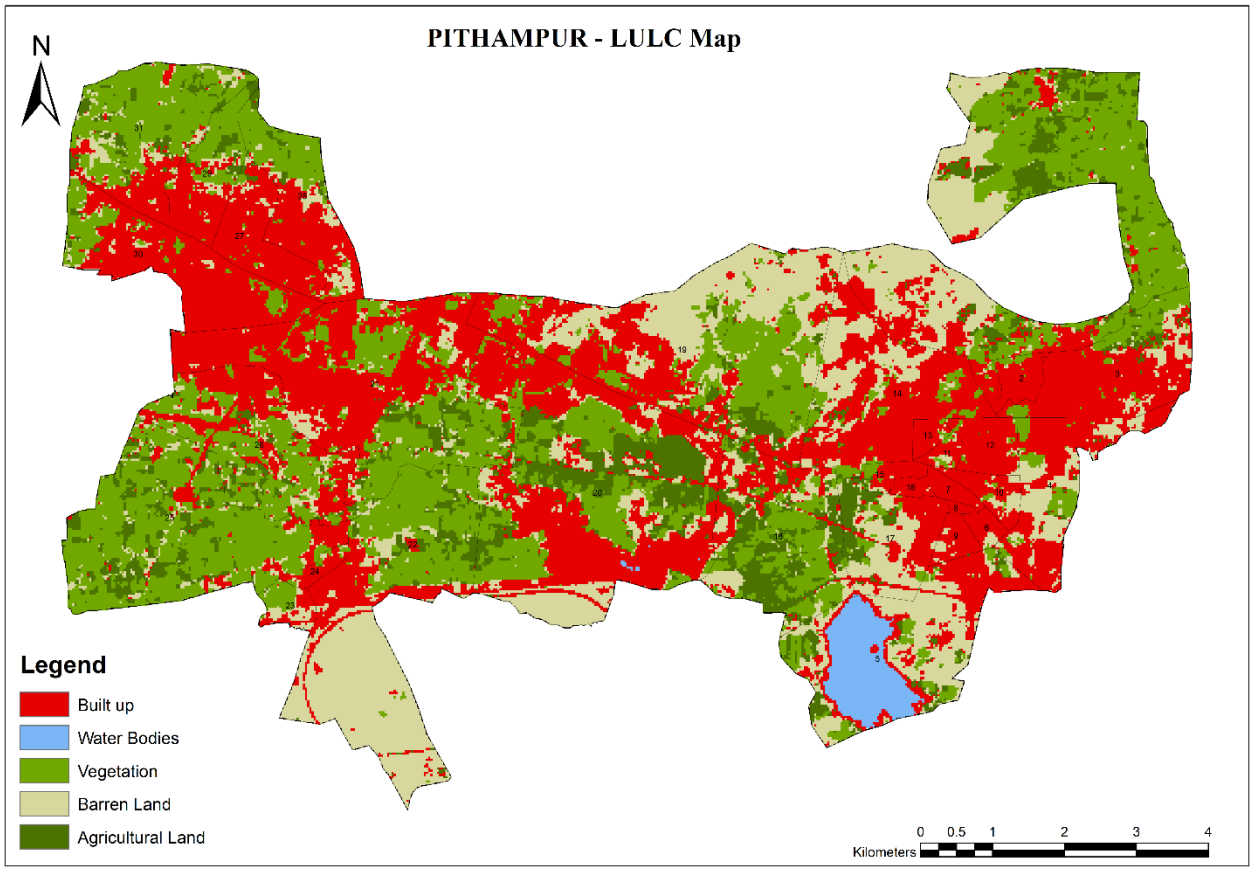


Figure 45 Land Use Land Cover Map Pithampur

Table 9 Land Use Land Cover Distribution

Land Cover	Area (in ha)	Percentage of Total
Built-Up	3118 ha	36.97%
Water Bodies	144 ha	1.71%
Vegetation	2577 ha	30.55%
Barren/Vacant Land	1802 ha	21.36%
Agriculture	793 ha	9.40%

The Land Use Land Cover (LULC) analysis of Pithampur highlights significant urban-industrial transformation in the region. Built-up areas occupy approximately 37% of the total land, indicating an accelerated pattern of spatial expansion and industrialization. This rapid growth aligns with Pithampur's positioning as a satellite town to Indore and as a major industrial hub under the influence of the Delhi-Mumbai Industrial Corridor

(DMIC).

Vegetation covers around 30.55% of the area and is interspersed between industrial zones and agricultural fields. However, agricultural land, once dominant, has declined to just 9.4%, reflecting a notable shift from agrarian to industrial-based land use. Barren or vacant lands constitute over 21.36%, indicating available land parcels that can be leveraged for strategic urban expansion or ecological conservation. Water bodies, although minimal (1.71%), play a critical role in groundwater recharge and should be protected against encroachment.

i) Inferences:

Spatial sprawl: Built-up zones are expanding in a dispersed manner, often encroaching into areas with existing green cover and potential agricultural value.

Green infrastructure: Despite a relatively high percentage of vegetation, the fragmentation and lack of connectivity between green patches raise concerns regarding urban microclimate and biodiversity sustainability.

Underutilized land: Vacant and barren areas offer a vital opportunity for planned future development, particularly for housing, logistics, or green buffer creation.

1.21 Existing Land Use Analysis – Pithampur

The existing land use pattern of Pithampur presents a comprehensive overview of its current spatial organization, with a clear dominance of agricultural and industrial land uses. This distribution reflects the town's transitional character from a primarily agrarian settlement to an emerging industrial and urban center.

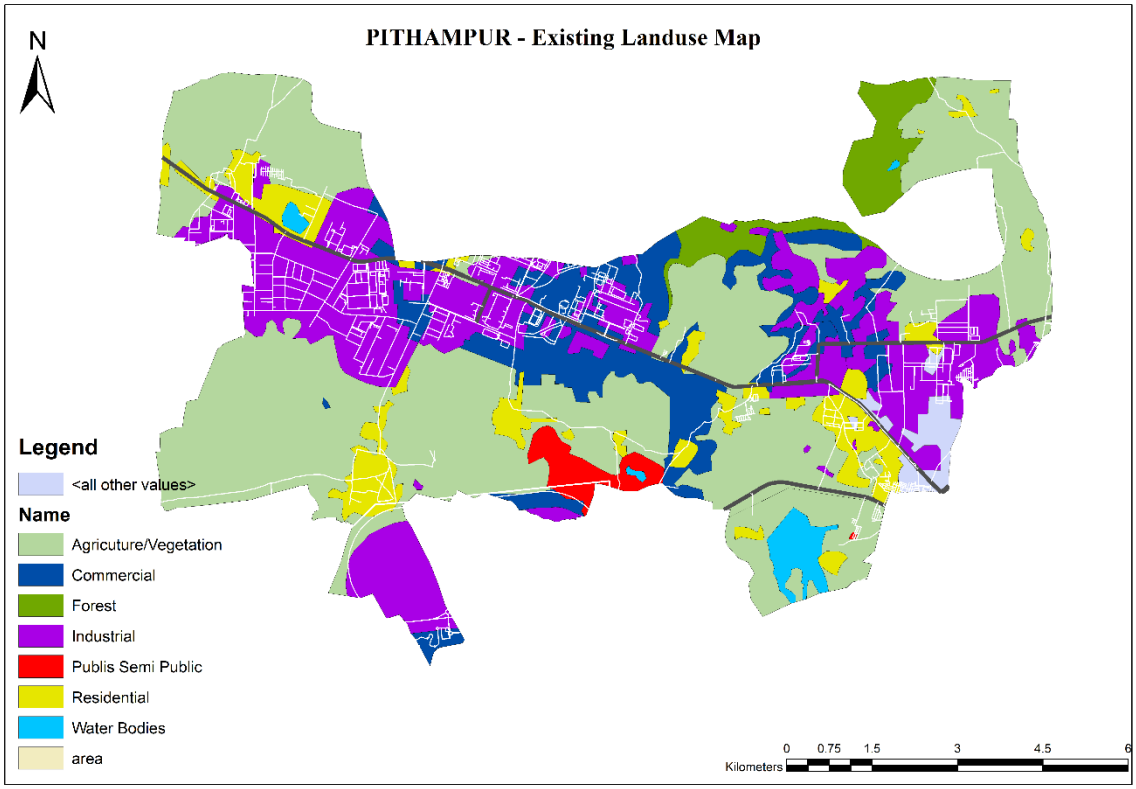


Figure 46 Existing Landuse Map - Pithampur

i) Key Land Use Distribution:

Table 10 Landuse Percentage Distribution

Land Use Category	Area (ha)	% of Total
Residential	637	8%
Industrial	1886	22%
Commercial	863	10%
Public Semi public	127	2%
Water Bodies	119	1%
Agriculture/Vegetation	4149	49%
Forest	331	4%
Transport and Communication	327	4%
Recreational	0	0%

- **Agriculture/Vegetation** occupies the **largest share at 49%**, highlighting Pithampur's agrarian legacy and availability of open lands. However, this land is increasingly under pressure due to industrial and residential expansion.
- **Industrial zones** cover approximately **22%** of the land, confirming Pithampur's role as a key industrial node in Madhya Pradesh. These zones are largely concentrated along major roads and transport corridors, enabling efficient logistics and movement of goods.
- **Residential land** accounts for only **8%**, indicating underdeveloped housing infrastructure relative to the growing population and industrial workforce. This results in scattered and unplanned residential pockets.
- **Commercial use** comprises **10%**, largely embedded within or around industrial zones, showing potential for mixed-use development but also a lack of structured commercial hubs.
- **Public and Semi-Public areas** are limited to **2%**, which is insufficient to meet civic infrastructure demands, including education, health, and administrative functions.
- **Forest areas** cover **4%**, while **water bodies** account for **1%**, emphasizing the need for stronger ecological preservation policies. **Recreational zones are non-existent (0%)**, a significant gap in livability and social well-being.
- **Transport and Communication infrastructure** occupies **4%**, which aligns with the presence of major industrial corridors but still reflects the need for broader and more integrated mobility networks.

1.22 SWOT Analysis of Pithampur

The SWOT analysis of Pithampur presents a comprehensive understanding of the town's current dynamics and its future urban and industrial trajectory. It highlights the significant strengths Pithampur possesses, the pressing weaknesses that need addressing, potential opportunities for integrated development, and the threats that could hamper sustainable growth.

Strengths

- Already designated as a Special Economic Zone (SEZ).
- Proximity to the Delhi-Mumbai Industrial Corridor (DMIC) enhances industrial potential.
- Presence of major industries in automobiles, pharmaceuticals, and engineering.
- Expansion plans for Sector 3 and new industrial zones (Pithampur II & III).
- Strong connectivity to Indore (32 km) via NH-52 and SH-27.
- Recognized as the "Detroit of India" due to its industrial branding.
- Hosts established SEZs and industrial estates, boosting investment confidence.

Weaknesses

- Over-dependence on a limited number of industrial sectors.

- Inadequate civic amenities (education, healthcare, recreation) compared to Indore.
- Fragmented land parcels hinder comprehensive urban planning.
- Limited public transport network within the town.
- Environmental concerns due to industrial pollution and declining green spaces.

Opportunities

- Potential to develop a smart, integrated industrial-residential township.
- Scope for green infrastructure (parks, ecological corridors) to enhance livability.
- Improving public transport and affordable housing can stimulate urban growth.
- Attracting new sectors like IT/ITES, biotechnology, and logistics hubs.
- Opportunity to establish eco-industrial parks and promote eco-tourism.

Threats

- Risk of **unplanned and unsustainable urban growth**.
- Economic vulnerability due to **dependence on industrial sectors**.
- **Environmental degradation** caused by unchecked industrial activities.
- **Traffic congestion and mobility issues** within and around Pithampur.

1.23 Inferences

Pithampur's explosive industrial growth (anchored by SEZs, DMIC, and the "Detroit of India" branding) has critically outpaced its urban infrastructure and livability frameworks, creating an unsustainable dichotomy where economic prowess coexists with severe deficits in housing, amenities, connectivity, and environmental resilience—demanding immediate integrated planning to transform it from an industrial enclave into a balanced, self-sustaining satellite city of Indore.

i) Key Drivers

Industrial Dominance vs. Urban Neglect:

22% industrial land vs. 8% residential land and 0% recreational space reflects a lopsided development model.

Projected population surge to 3.68 lakh by 2045 will intensify housing shortages and service gaps without intervention.

Spatial Imbalance:

High-density central wards suffer infrastructure overload, while low-density peripheries lack basic access (e.g., 500m+ road buffer gaps).

21.36% vacant land offers strategic reserves but risks chaotic encroachment if unguided.

Connectivity–Livability Mismatch:

Global logistics links (DMIC, dry port) coexist with local transport gaps, forcing worker dependency on Indore.

No metro/public transit within town exacerbates congestion and pollution.

Economic Vulnerability:

Over-reliance on auto/pharma sectors (SWOT) risks instability, while absent economic diversification misses IT/biotech opportunities.

The Crossroads:

Without integrated planning, it risks becoming an unsustainable industrial sprawl plagued by congestion, inequity, and ecological decline.

With strategic rebalancing (housing near industry, green buffers, transit-oriented development), it can emerge as India's model industrial satellite—leveraging Indore's proximity while offering holistic growth.

1.24 Land Suitability Analysis

1.25 Factors taken into Consideration

In order to identify optimal zones for multi-sector development in Pithampur, a comprehensive **GIS-based Weighted Overlay Analysis** was performed using the **Analytical Hierarchy Process (AHP)**. This approach allowed for systematic comparison and prioritization of multiple planning criteria based on expert judgment. The following six key factors were considered:

i) Land Use Land Cover (LULC)

LULC is used in suitability analysis to determine the current state and function of the land. Vacant and agricultural lands are generally more adaptable for development. In contrast, forested and water-covered areas are considered less suitable due to environmental constraints.

ii) Existing Land Use

Understanding the existing land use allows planners to identify areas already developed or in use, which helps in minimizing conflicts. Areas with mixed or underutilized land use may offer better opportunities for development.

iii) Road Proximity Buffer

This factor evaluates accessibility. Areas closer to roads are more suitable for development due to ease of transportation, logistics, and infrastructure connectivity. Distance from roads reduces the practical viability of development.

iv) Slope

Slope influences construction feasibility. Flatter terrains are more suitable due to lower construction costs and minimal risk of erosion or structural instability, while steeper areas pose challenges for building and infrastructure.

v) Elevation

Elevation plays a role in climate, drainage, and construction difficulty. Lower elevation areas are generally preferred due to easier access to utilities and reduced cost, whereas high-altitude regions can be more challenging.

vi) Population Density

Areas with low population density are often more suitable for new development, as they tend to have more available space and fewer infrastructure constraints. Densely populated areas may face overcrowding, limited land availability, and higher development costs.

1.26 SuitabilityAnalysis – Weight Derivation Methodology

The suitability analysis for Pithampur was carried out using the **Analytical Hierarchy Process (AHP)** integrated with **GIS-based Weighted Overlay Analysis**. This hybrid method allows for objective, spatially-explicit decision-making by incorporating both expert judgment and geographic data.

The process involved the following steps:

a) Pairwise Comparison Matrix (Saaty's AHP Model)

Table 11 Pairwise Comparison Matrix

Criteria ↓ vs →	LULC	Existing Landuse	Road Buffer	Slope	Elevation	Pop. Density
LULC	1	2	4	5	6	7
Existing LU	1/2	1	3	4	5	6
Road Buffer	1/4	1/3	1	2	3	4
Slope	1/5	1/4	1/2	1	2	3
Elevation	1/6	1/5	1/3	1/2	1	2
Pop. Density	1/7	1/6	1/4	1/3	1/2	1

Each of the six selected criteria was compared pairwise using **Saaty's 1–9 scale**, which quantifies the relative importance of each criterion. A matrix was developed based on expert inputs to represent these comparisons.

b) Product Value and Nth Root Calculation

To synthesize the matrix:

- Row products were calculated to determine the overall influence of each criterion relative to others.
- The **6th root** of each product was computed to bring values into a balanced, comparable scale.

c) Weight Derivation (Normalization)

Table 12 Normalized Weight Derivation

Criteria	Product	6th Root	Normalized Weight	Weight (%)
LULC	**1680.0000**	**3.4479**	**0.4074**	**40.74%**
Existing Landuse	**180.0000**	**2.3762**	**0.2808**	**28.08%**
Road Buffer	**2.0000**	**1.1225**	**0.1326**	**13.26%**
Slope	**0.1500**	**0.7289**	**0.0861**	**8.61%**
Elevation	**0.0111**	**0.4724**	**0.0558**	**5.58%**
Population Density	**0.0010**	**0.3158**	**0.0373**	**3.73%**

The 6th root values were normalized to derive **relative weights** for each criterion. These weights represent each factor's contribution to overall suitability and ensure that the final overlay map reflects rational, priority-based evaluation.

d) Consistency Check (CI and CR)
A consistency check was performed to validate the reliability of expert comparisons:

- The **Consistency Index (CI)** was calculated as **0.116**
- The **Consistency Ratio (CR)** was **9.35%**, which is below the acceptable threshold of 10%

This confirms that the judgments used in the matrix were consistent and suitable for analysis.

e) Weighted Overlay in GIS
The finalized weights were applied to reclassified raster layers of each criterion in a **GIS environment**. Each class within the criteria was assigned a **Suitability Score** from 1 (Least Suitable) to 5 (Most Suitable). These reclassified layers were then overlaid using the derived weights to produce the **Final Suitability Map**.

1.27 Spatial Suitability Mapping & Results

The final output of the analysis is a **spatial suitability map for multi-sector development** in Pithampur. This map integrates all six criteria, weighted according to their influence, to highlight the most and least suitable areas.

- **Key Findings:**
- **LULC (40.74%)** had the strongest influence. Vacant and agricultural lands are most prioritized for future development.
- **Existing Land Use (28.08%)** supports development in underutilized or mixed-use areas while protecting ecologically sensitive zones.
- **Road Proximity Buffer (13.26%)** emphasizes the importance of accessibility, favoring areas within 200 meters of roads.
- **Slope (8.61%)** and **Elevation (5.5%)** limit suitability in steeper and higher terrain.
- **Population Density (3.73%)** favors sparsely populated zones, helping reduce strain on infrastructure.

Each criterion was visualized through thematic layers, and the combined overlay highlights zones as:

- **Most Suitable (Score: 5)**
- **Suitable (Score: 4)**
- **Moderately Suitable (Score: 3)**
- **Less Suitable (Score: 2)**
- **Least Suitable (Score: 1)**
- **Conclusion:**

This multi-criteria, GIS-integrated approach provides a robust framework for urban and regional planners to prioritize land parcels for development. The weighted overlay ensures that ecological, infrastructural, and socio-demographic factors are all considered in a balanced, transparent, and scientifically defensible manner.

1.28 Land Suitability Mapping

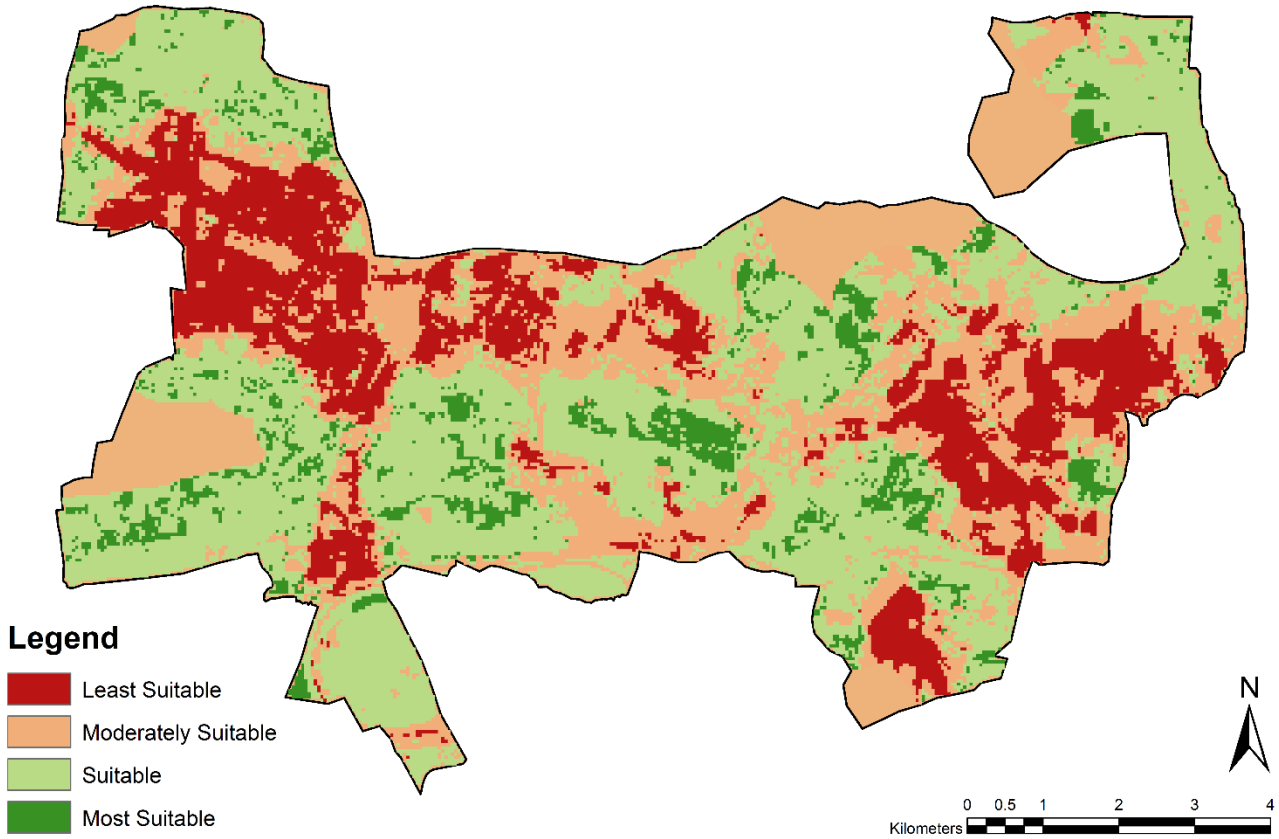


Figure 47 Land Suitability Map of Pithampur

The final suitability map for Pithampur was developed using a GIS-based weighted overlay technique, integrating multiple spatial criteria identified through the Analytical Hierarchy Process (AHP). The map categorizes the region into four suitability classes:

Most Suitable (Dark Green): These areas are primarily located in the central and southern parts of the region. They possess favorable land use, good accessibility, gentle slopes, and low population densities, making them ideal for multi-sector development.

Suitable (Light Green): Widely spread across the region, these zones offer a balanced mix of development potential and moderate planning constraints.

Moderately Suitable (Orange): Found mainly in the periphery, these areas have some limiting factors such as higher elevation, distance from roads, or denser population clusters.

Least Suitable (Red): Concentrated in the north-central and eastern parts, these zones include environmentally sensitive or infrastructurally constrained areas, such as steep slopes, forests, or existing dense developments.

i) Residential Suitability

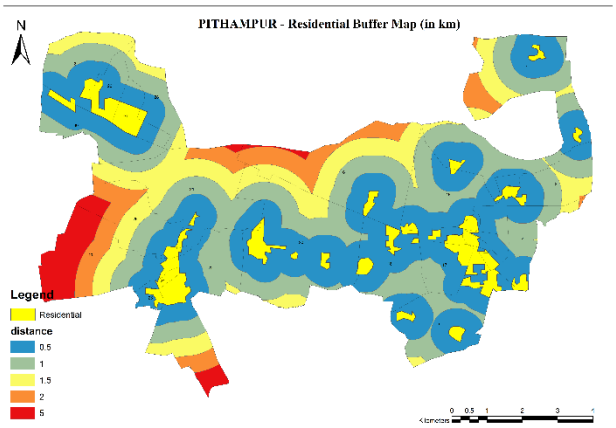


Figure 49 Residential Buffer Map

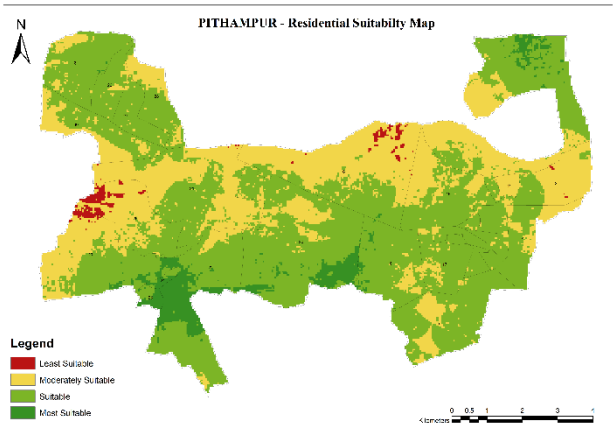


Figure 48 Residential Suitability Map

The residential suitability map highlights areas ideal for housing development. It prioritizes locations near roads, with gentle slopes, lower elevations, and low to moderate population density. These areas offer good accessibility, ease of construction, and room for community expansion. Most suitable zones are concentrated in the central and southern regions, while forested, steep, or densely built-up areas are least suitable.

ii) Industrial Suitability

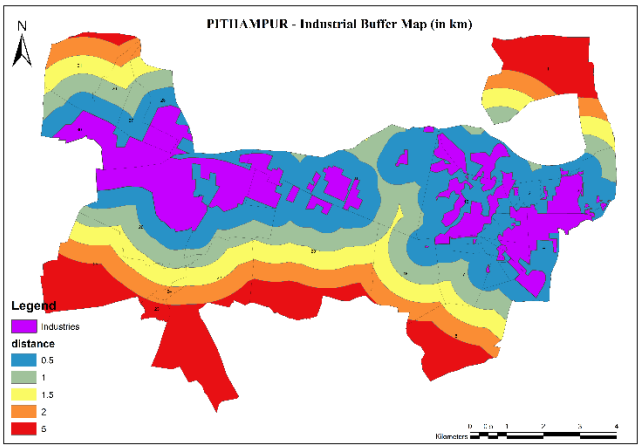


Figure 51 Industrial Buffer Map

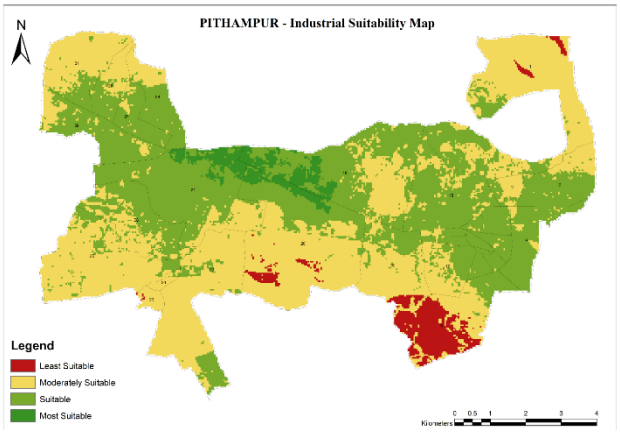


Figure 50 Industrial Suitability Map

The industrial suitability map identifies land best suited for industries. Key considerations include proximity to transport routes, flat terrain, existing industrial zones, and low population density. These factors support efficient infrastructure and minimize land-use conflicts. Western and northeastern parts of Pithampur show high potential for industrial growth, whereas environmentally sensitive or heavily populated areas are less favorable.

1.29 Planning Norms

The planning process for residential and industrial development in Pithampur follows key benchmarks from the URDPFI guidelines, ensuring structured and balanced land use.

i) Population Density Norms

The URDPFI provides recommended population densities for different settlement types. These standards help in estimating carrying capacity and planning services and infrastructure efficiently for future population growth.

Since the Density of Pithampur lies between 75 – 125 pph it is categorized under small towns.

Table 5.1: Developed Area Average Densities

Settlement Type	Persons per Hectare(pph) in	
	Plain Areas	Hill Areas
Small Towns	75-125	45-75
Medium Town	100-150	60-90
Large Cities	125-175	60-90
Metropolitan Cities	125-175	100-150
Megapolis	More than 200	--

Source: *Revised based on UDPFI Guidelines.*

ii) Land Use Distribution for Industrial Towns

The guidelines also propose a comprehensive land use structure for industrial towns to ensure functional efficiency and sustainable development. As per the norms:

5.5.3.3. Proposed Land use Structure of Industrial towns

Table 5.6: Land use structure for Industrial towns[54]

Sl. No.	Land use Category	Percentage of Developable Area
1	Residential	20-25
2	Commercial	3-4
3	Industrial	30-35
4	Public and Semi-Public	6 -8
5	Recreational	12-15
6	Transport and Communication (including logistics)	10-12
7	Water bodies & Special areas	Balance
	Total	**100**

Note: The above landuse distribution is indicative, and may vary as per the size of SEZ, industrial town, cluster development.

[53] Draft SEZ Guidelines study by TCPO presented to the Parliament Standing Committee.

[54] Ibid.

- **Residential use** should cover 20–25% of the developable area.
- **Industrial use** is allotted the largest share, at 30–35%, supporting economic activity.
- Other key allocations include **Commercial (3–4%)**, **Public/Semi-Public (8–10%)**, **Recreational (10–12%)**, and **Transport & Communication (10–12%)**.
- The remainder is reserved for **Water bodies and special areas**, ensuring environmental balance and flexibility.

These norms guide spatial allocation and help maintain a balanced urban structure while promoting livability and industrial productivity.

7. Proposals and Recommendations

i) Local Area Plan (LAP) - Zonal Development Plan (ZDP)

In alignment with the URDPFI (Urban and Regional Development Plans Formulation and Implementation) guidelines, this proposal presents a Local Area Plan (LAP) integrated with a Zonal Development Plan (ZDP) aimed at guiding planned urban development in the identified region. The objective is to provide a detailed spatial framework for infrastructure provision, land use distribution, and phased development while ensuring compatibility with broader master planning goals. This plan serves as a strategic tool for implementing sector-wise priorities, regulating land utilization, and enhancing the overall functionality and sustainability of the urban area.

"Local Area Plan (LAP)": - Zonal Development Plan
Local Area Plans are detailed sub-city-level plans prepared for a specific part of the city, typically municipal ward clusters, to guide development, infrastructure upgrades, and urban design improvements. (URDPFI 2015)

While the *Pithampur Development Plan 2035* outlines a macro-level vision for the wider region, this proposed plan focuses specifically on the **31 municipal wards** of Pithampur, aligning with the **Local Area Plan (LAP)** typology as defined in the **URDPFI Guidelines (2015), Volume I, Chapter 10**. The LAP enables detailed spatial and sectoral planning at the sub-city level to address the unique developmental needs of a defined municipal area. By offering ward-level zoning refinements, diversified economic proposals, and infrastructure alignment, this plan complements the Draft Development Plan 2035 by translating broader directives into actionable strategies, thus supporting **phased, contextual, and locally-driven implementation**.

1.2 Landuse Categorization for ZDP

Table 13 Landuse Distribution for Pithampur ZDP

Land Use Category	Subdivision/Classifications	Current Landuse Structure	Suggested Landuse Structure	Proposed Percentage
Residential (R_1, R_2)	- R_1: Pure Residential - R_2: Residential with Shops at Ground	**8%**	**20-25 %**	**15%**
Commercial (C_1, C_2)	- C_1: Local Commercial Areas - C_2: District Commercial Areas	**10%**	**3 -4%**	**8%**

Industrial (I_1, I_2, I_3)	- I_1: Service Industries (warehousing, repair) - I_2: General Industries (Manufacturing, Textile, Auto-ancillary) - I_3: Special Industries (Pharma, Agro-based, Heavy Industries)	**22%**	**30-35 %**	**30%**
Public/Semi-Public	Educational, Health, Institutional	**2%**	**6-8 %**	**6%**
Recreational	Parks, Sports Complexes, Eco-parks	**0%**	**12-15 %**	**8%**
Transport and Communication	Roads, Metro Stations, Logistics Parks	**4%**	**10-12 %**	**10%**
Water Bodies	Lakes, Streams, Canals	**1%**	**Balance**	**Preserve and develop 1%**
Agriculture/Vegetation	Green Buffer Zones, Agro-Parks	**49%**		**Retain Balance**
Forest	Eco-sensitive zones	**4%**		**Retain 4%**

1.3 Planning Program for Pithampur – Zonal Development Plan

What the Plan intends to solve?

- Decongest Indore by absorbing population and economic pressure.
- Integrate Pithampur's Industrial Corridors character with residential and service-based growth.
- Improve infrastructure and liveability in Pithampur.
- Ensure environmental sustainability and resilience while doing the required.
- Develop strong connectivity between Indore and Pithampur. (Covered by Indore- Pithampur Economic Corridor)

Table 14 Planning Program for Pithampur

Issue	Proposed Urban Planning Solution
Industrial concentration in limited sectors	Diversify the economic base by introducing: – IT/Software hubs – MSME parks – Logistics & agro-processing clusters – Innovation and R&D parks
Industrial disturbance to residential and sensitive zones	Introduce **500–700m green buffers** with urban forests Promote **mixed-use zoning** around buffers Enforce zoning regulations to minimize noise/pollution near residential zones
Underutilized branding of NATRAX & "Detroit of India" title	Rebrand Pithampur as **"NatraNagari"** Launch **Automotive Excellence Cluster** near NATRAX Create a public-facing **AutoTech Valley** with: EV zones, motorsport areas, R&D, and auto start-up hubs
Overconcentration of Industry in Zone	Diversifying without disturbing SEZ and Industrial Sector 1, 2 and 3 Promote **Integrated Industrial Townships** with 60:40 ratio of industry to residential + services
Inefficient goods movement despite industrial potential	Propose a **Multimodal Logistics Hub** near NH-3, Tihi ICD, and DMIC Integrate road, rail, and future metro freight for seamless connectivity
Low residential appeal for workforce	Plan **affordable, walk-to-work housing** near industrial areas Promote vertical housing with good amenities
Environmental degradation and lack of green space	Create **urban forest zones** and **eco-sensitive buffers** Protect existing lakes and slopes through green zoning Implement rainwater harvesting and eco-park development

1.4 Planning Concept and Considerations

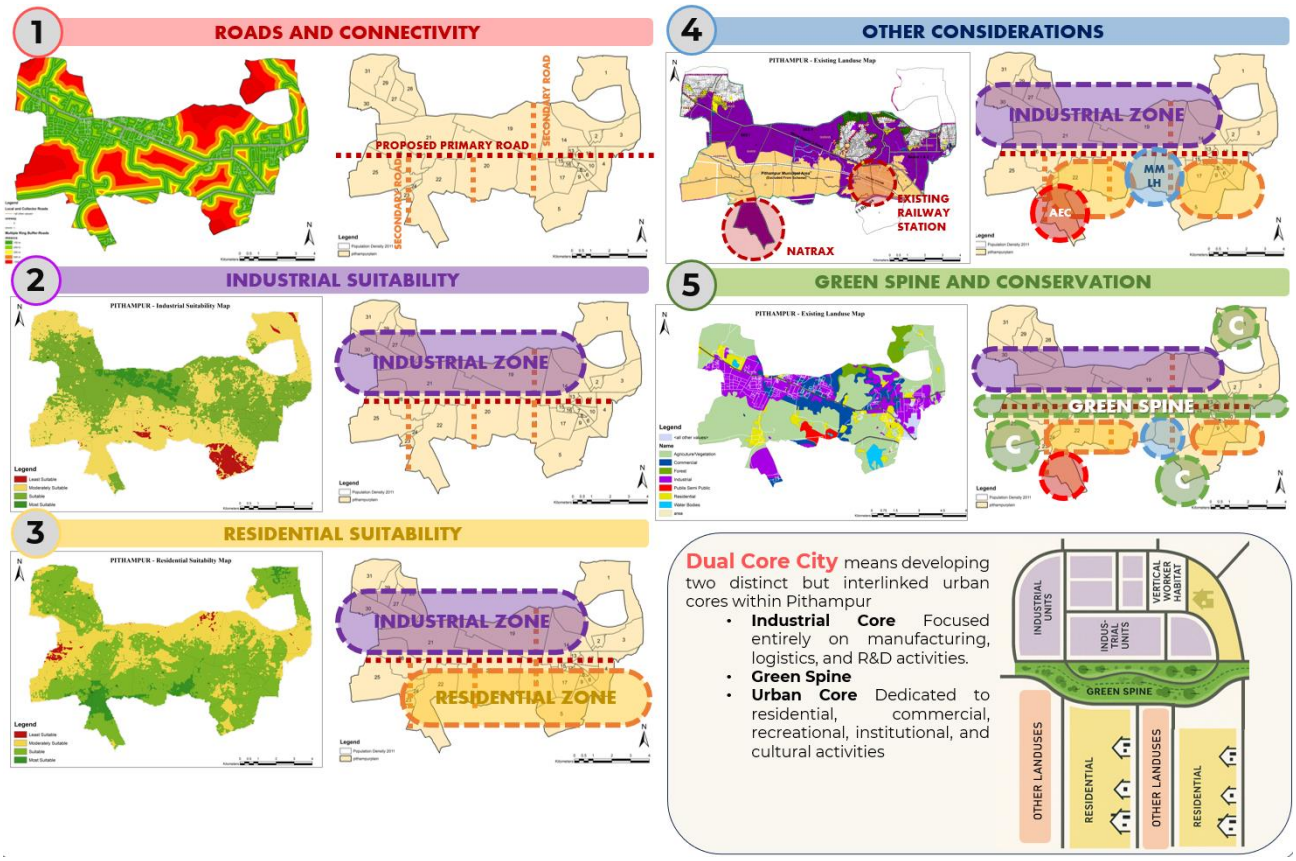


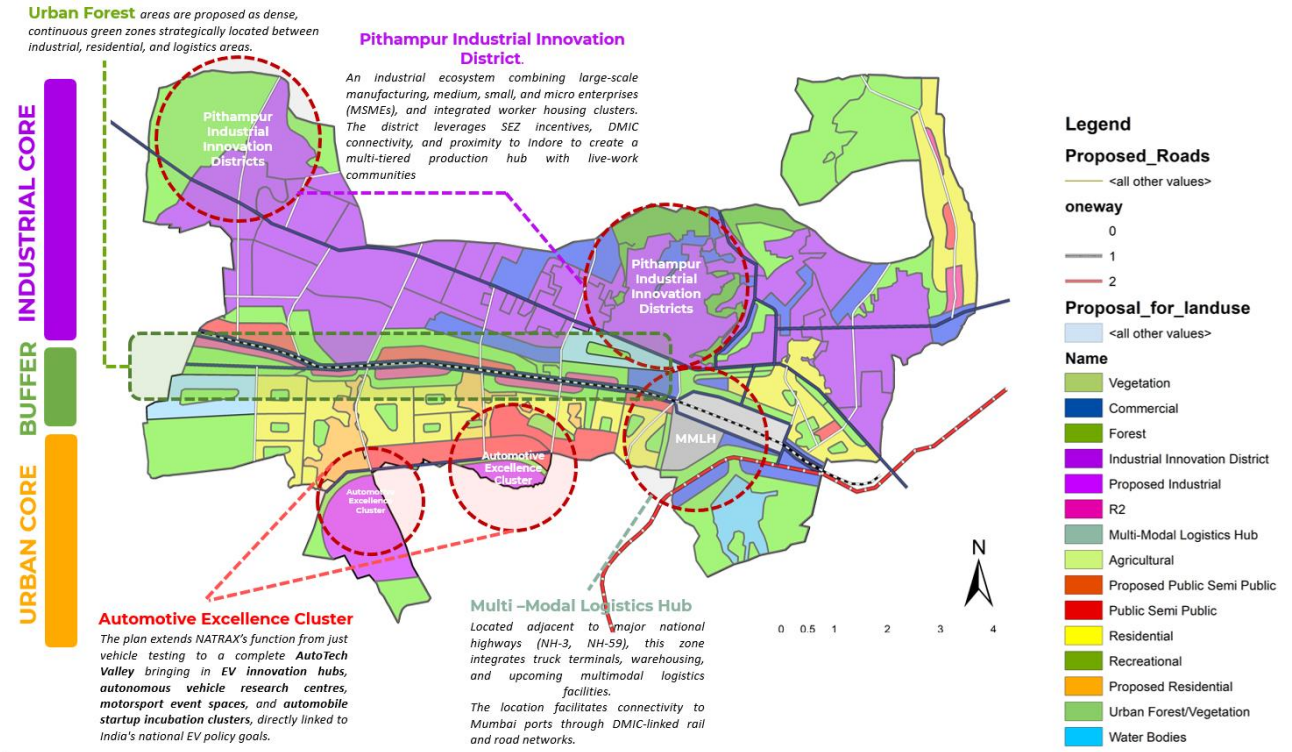
Figure 52 Planning Concept

The vision for Pithampur reimagines the town as a **"Dual Core City"**, balancing productivity with livability through two distinct but interconnected zones — an **Industrial Core** and an **Urban Core** — unified by a continuous **Green Spine**.

- **Mobility-Led Growth**: A well-structured road network of proposed primary and secondary roads lays the groundwork for seamless intra-city movement and future public transit integration. This framework supports walkability, logistics, and smart mobility corridors.
- **Industrial Core**: Located centrally, this core taps into high industrial suitability zones and existing connectivity to promote a next-generation manufacturing ecosystem — focused on clean industries, logistics, and innovation clusters.
- **Urban Core**: Positioned in the southern belt, the residential zone supports compact, mixed-use neighborhoods. It prioritizes quality of life through access to housing, amenities, and employment opportunities — all within a 15-minute radius.
- **Green Spine**: More than a buffer, the green spine acts as a **living infrastructure** — linking ecological patches, offering public spaces, and reinforcing climate resilience. It becomes a civic identity — a parkway that breathes life into the city.
- **Strategic Catalysts**: Landmarks such as the **NATRAX testing track** and the **existing railway station** are positioned as economic engines, anchoring employment and attracting investment.

i) Zonal Development Plan – Pithampur

1.5 PROPOSAL 1 – Zonal Development Plan for Pithampur as a Satellite Town to Indore


Urban Forest areas are proposed as dense, continuous green zones strategically located between industrial, residential, and logistics areas.
Pithampur Industrial Innovation District.
An industrial ecosystem combining large-scale manufacturing, medium, small, and micro enterprises (MSMEs), and integrated worker housing clusters. The district leverages SEZ incentives, DMIC connectivity, and proximity to Indore to create a multi-tiered production hub with live-work communities
INDUSTRIAL CORE
BUFFER
URBAN CORE
Pithampur Industrial Innovation Districts
Pithampur Industrial Innovation Districts
MMLH
Automotive Excellence cluster
Automotive Excellence Cluster
Automotive Excellence Cluster
The plan extends NATRAX's function from just vehicle testing to a complete AutoTech Valley bringing in EV innovation hubs, autonomous vehicle research centres, motorsport event spaces, and automobile startup incubation clusters, directly linked to India's national EV policy goals.
Multi –Modal Logistics Hub
Located adjacent to major national highways (NH-3, NH-59), this zone integrates truck terminals, warehousing, and upcoming multimodal logistics facilities.
The location facilitates connectivity to Mumbai ports through DMIC-linked rail and road networks.
N
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Legend
Proposed_Roads
<all other values>
oneway
0
1
2
Proposal_for_landuse
<all other values>
Name
Vegetation
Commercial
Forest
Industrial Innovation District
Proposed Industrial
R2
Multi-Modal Logistics Hub
Agricultural
Proposed Public Semi Public
Public Semi Public
Residential
Recreational
Proposed Residential
Urban Forest/Vegetation
Water Bodies

Figure 53 Zonal Development Plan - Pithampur

The proposed Zonal Development Plan for Pithampur reimagines the city as a dynamic **Dual Core City**, strategically divided into an **Industrial Core** and an **Urban Core**, bridged by a continuous **Urban Forest Buffer**. This structure aligns with URDPFI guidelines while responding to local suitability assessments and future growth aspirations.

1. Expansion of Industrial Land Use to 30%

- A major leap from the existing 22% to **30%** industrial land coverage.
- Establishment of the **Pithampur Industrial Innovation District**, a new manufacturing ecosystem integrating MSMEs, SEZ-linked incentives, and live-work housing clusters.
- *An industrial ecosystem combining large-scale manufacturing, medium, small, and micro enterprises (MSMEs), and integrated worker housing clusters. The district leverages SEZ incentives, DMIC connectivity, and proximity to Indore to create a multi-tiered production hub with live-work communities*
-

2. Automotive Excellence Cluster

- A **new innovation-driven automotive hub** near NATRAX.
- Proposed as an **AutoTech Valley**, focusing on EV innovation, autonomous vehicles, motorsport infrastructure, and startup incubation linked to national EV policies.

*The plan extends NATRAX's function from just vehicle testing to a complete **AutoTech Valley** bringing in **EV innovation hubs**, **autonomous vehicle research centres**, **motorsport event spaces**, and **automobile startup incubation clusters**, directly linked to India's national EV policy goals*

3. Multi-Modal Logistics Hub (MMLH)

- Strategically located near NH-3 and NH-59.
- **Newly designated logistics zone** integrating warehousing, truck terminals, and rail connectivity through DMIC.
- Enhances Pithampur's role in national supply chains.
- *Located adjacent to major national highways (NH-3, NH-59), this zone integrates truck terminals, warehousing, and upcoming multimodal logistics facilities. The location facilitates connectivity to Mumbai ports through DMIC-linked rail and road networks.*

4. Urban Forest & Green Buffer Zones

- Introduction of a **continuous Urban Forest belt**—a first-of-its-kind green spine acting as a **buffer between industrial and residential zones**.
- Urban ecological zones to preserve air quality, promote biodiversity, and act as recreational green lungs.

5. Increased Residential Allocation

- Residential land (R1 & R2) increased from 8% to **23%**, addressing housing demands of an expanding workforce.
- New residential clusters are proposed near industrial areas to reduce travel time and promote live-work balance.

6. Boost in Recreational and Public Infrastructure

- **Recreational spaces increased** to 12–15%, including eco-parks and sports facilities near water bodies.
- **Public/Semi-public uses expanded** to 6–8%, offering upgraded health, education, and institutional infrastructure.
- **7. Enhanced Mobility Infrastructure**
- **10–12% land** now dedicated to transport and communication.
- Includes road widening, **proposed expressway nodes**, and **metro link integration** with the logistics and industrial core.

Conclusion: Pithampur as an Industrial Innovation Urban Hub

These new proposals elevate Pithampur beyond a conventional industrial town. With a dual-core structure, dedicated innovation zones, and smart infrastructure, the city is poised to become a **national benchmark in integrated industrial-urban development**. The vision is bold, the structure is balanced, and the approach is deeply rooted in sustainability, inclusivity, and resilience.

1.6 PROPOSAL 2 - Development of Industrial Innovation Districts in Pithampur

- **4.2.1 Vision**

To develop **Pithampur as a greenfield, smart, and sustainable industrial satellite city** integrated with Indore's growth corridor, fostering sustainable industrialization, balanced urban development, and seamless connectivity with the regional urban network.

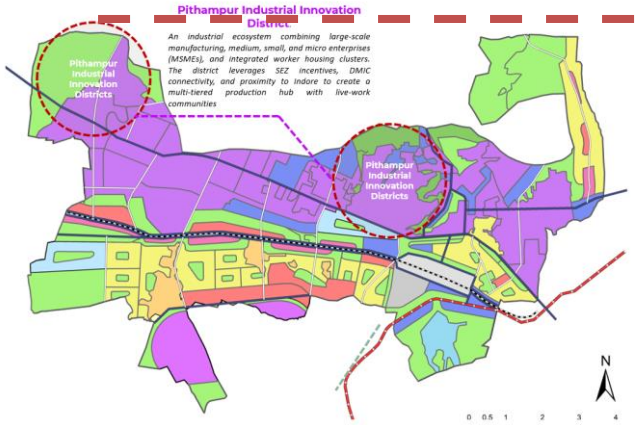
Pithampur Industrial Innovation District
An industrial ecosystem combining large-scale manufacturing, medium, small, and micro enterprises (MSMEs), and integrated worker housing clusters. The district leverages SEZ incentives, DMIC connectivity, and proximity to Indore to create a multi-tiered production hub with live-work communities
Pithampur Industrial Innovation Districts
Pithampur Industrial Innovation Districts
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Figure 55 Key Map

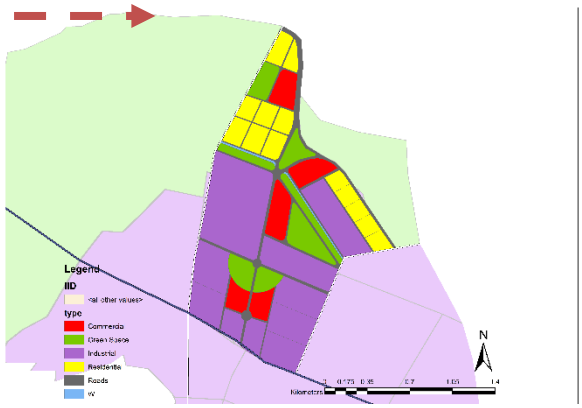

Figure 54 IID Landuse Map

- **4.2.2 Rationale**

Pithampur, owing to its strategic location along the Delhi-Mumbai Industrial Corridor (DMIC) and proximity to Indore, presents a significant opportunity for industrial and urban growth. The proposal aims to harness this potential by introducing a **planned Industrial Innovation District (IID)** model that integrates industrial development with residential, commercial, and recreational land uses, ensuring an environmentally responsible and economically resilient urban form.

- **4.2.3 Land Use Pattern**

The proposed IID follows a balanced land use distribution:

- **Industrial Use:** 50.78%
- **Residential:** 18.43%
- **Commercial:** 5.83%
- **Open Green Spaces:** 15.39%
- **Utilities:** 1.68%

This pattern is aimed at supporting not only industrial productivity but also ensuring quality living standards, ecological balance, and functional urban connectivity.

- **4.2.4 Proposed Sectoral Focus**

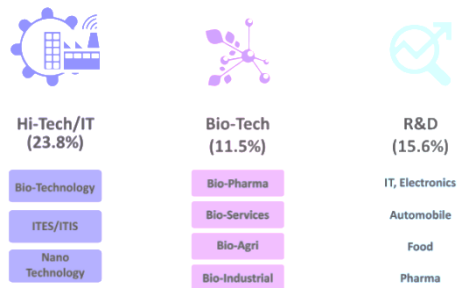

Figure 56 Industrial Sectors at IID

The IID is envisioned to house industry sectors that reflect both current demand and future growth potential:

- **Hi-Tech/IT (23.8%)**: Including Bio-Technology, IT Enabled Services, Nano Technology, and Opto-Electronics.
- **Bio-Technology (11.5%)**: Focused on Bio-Pharma, Bio-Services, Bio-Agriculture, and Bio-Informatics.
- **Research & Development (15.6%)**: Emphasizing innovation in Automobile, Electronics, Healthcare, Pharma, and Food industries.

This sectoral focus aligns with national industrial policies and global trends in high-value, technology-driven industrialization.

- **4.2.5 Planning Principles and Urban Form**

The planning approach for the IID is based on sustainable and inclusive urban development principles:

- **Cluster Planning:** Compact and integrated industrial and residential clusters with shared infrastructure.
- **Walk-to-Work Concept:** Reducing travel demand and promoting healthy lifestyles.
- **Plug & Play Infrastructure:** Ready-to-use industrial plots with essential utilities and services.
- **15.39% Green Open Spaces:** Parks, green buffers, and recreational zones enhancing environmental quality.
- **Inclusive Housing Provision:** Including EWS housing to accommodate workers of various income groups.
- **Non-Polluting Industries:** Prioritizing eco-friendly and clean industrial sectors.

- **4.2.6 Socio-Economic and Urban Benefits**
- Acts as a **catalyst for regional industrial development**.
- Generates employment across multiple skill levels.
- Supports the **development of residential, commercial, medical, educational, and recreational infrastructure**.
- Promotes **value addition to existing industries** while encouraging new, innovation-led enterprises.
- Enhances the region's economic resilience and competitiveness.

- **4.2.7 Alignment with National and Regional Initiatives**

The **of**

CABINET DECISION
28TH AUGUST, 2024
Grand necklace of Industrial Smart Cities
Cabinet approves 12 Industrial cities under National Industrial Corridor Development Programme
Estimated investment of Rs. 28,602 crore
Projects to span across 10 states and strategically planned along 6 major corridors
Khurpia in Uttarakhand
Rajpura-Patiala in Punjab
Dighi in, Maharashtra
Palakkad in Kerela
Agra and Prayagraj in UP
Gaya in Bihar
Zaheerabad in Telangana
Orvakal and Kopparthy in AP
Jodhpur-Pali in Rajasthan
1/2

proposal is strategically aligned with the **'Grand Necklace Industrial Smart Cities'** initiative under the National Industrial Corridor Development Program, which envisions interconnected, future-ready industrial cities across India. Pithampur's inclusion in this network will elevate its industrial profile and urban importance.

1.7 PROPOSAL 3 - Development of a Multi-Modal Logistics Hub (Freight Village) in Pithampur

- **4.3.1 Vision**

To establish a **state-of-the-art Multi-Modal Logistics Hub (MMLH)** in Pithampur, strategically integrated with national and regional transport corridors, supporting industrial freight movement, reducing transit costs, and positioning Pithampur as a crucial logistics and warehousing node within central India's economic network.

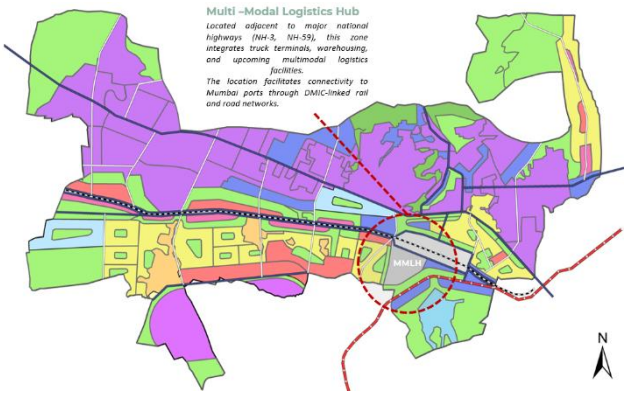
Multi –Modal Logistics Hub
Located adjacent to major national highways (NH-3, NH-59), this zone integrates truck terminals, warehousing, and upcoming multimodal logistics facilities.
The location facilitates connectivity to Mumbai ports through DMIC-linked rail and road networks.
MMLH
N

Figure 58 Key Plan

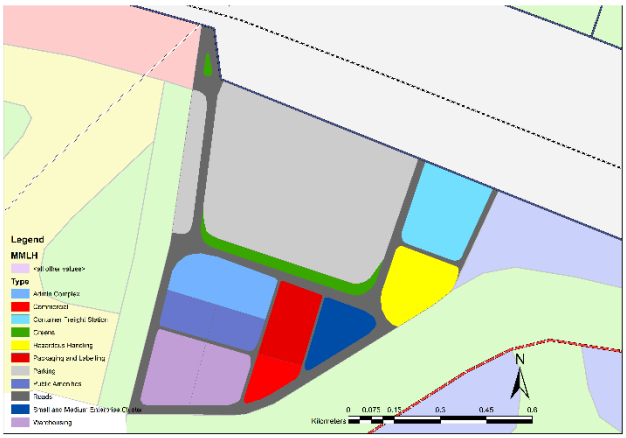

Figure 57 Multi Modal Logistics Hub Plan

Area of Proposal : 100 ha

- **4.3.2 Rationale**

Pithampur's proximity to major national highways (NH-3 and NH-59), the Delhi-Mumbai Industrial Corridor (DMIC), and proposed rail freight corridors makes it an ideal location for a **multi-modal logistics facility**. The development of this logistics hub would strengthen Pithampur's role as an industrial satellite town, enabling seamless freight transit, efficient goods handling, and export-import facilitation — essential for industries in Pithampur, Indore, and the larger regional economy.

- **4.3.3 Planning Framework and Land Use Distribution**

The proposed MMLH covers a well-defined, strategically located zone dedicated to logistics-related infrastructure and services. Land use distribution includes:

- **Container Freight Station**
- **Warehousing and Cold Storage**
- **Packing and Loading Facilities**
- **Customs Clearance Facility**
- **Small and Medium Enterprise (SME) Clusters**
- **Parking, Public Amenities, and Service Yards**

The hub's placement within the overall Pithampur development plan ensures logistical efficiency, with direct access to proposed industrial, residential, and green buffer zones.

- **4.3.4 Key Features and Advantages**
- **Direct Production and Transit**: Eliminates intermediate storage requirements, ensuring faster goods movement from production units to markets.
- **Custom Clearance Facility**: On-site customs operations to expedite export processes for

industries, benefiting export-driven sectors.

- **Port Connectivity**: Facilitates direct shipment to key ports including Mumbai (West) and Kolkata (East), reducing logistical turnaround times.
- **Reduced Transit Costs**: Integrated multi-modal services lower freight handling and transportation expenses for industries.
- **Dry Port Functionality**: Acts as a storage, aggregation, and customs checkpoint for industrial cargo, improving regional logistics competitiveness.

- **4.3.5 Integration with Regional and National Networks**

The MMLH is aligned with national infrastructure initiatives, including:

- **Delhi-Mumbai Industrial Corridor (DMIC)**
- **National Highway Development Projects (NH-3, NH-59)**

This ensures high-capacity connectivity for industrial freight, enhancing Pithampur's attractiveness for industrial investors and logistics operators.

i) Residential Land Use Phasing

The proposed residential land use phasing for Pithampur, envisioned as a strategic satellite settlement to the metropolitan core of Indore, is structured to accommodate projected population growth in a phased and sustainable manner. A total of 1312 hectares of land has been allocated under the residential zoning designation, of which only 60% (i.e., 787 hectares) is earmarked for actual construction, in adherence to development control norms and optimal land use efficiency.

1.8 Population Projection and Phased Land Requirement

Based on incremental population projections, the town is expected to witness a significant demographic expansion from 205,101 (2025) to 368,067 (2045). The phasing of land use has been aligned with these forecasts to prevent overdevelopment and ensure phased infrastructure provisioning.

Phase	Year Range	Population	Land Required (ha) @ FSI=1	Land Required (ha) @ FSI=0.75
Phase 1	Up to 2035	286,584	665.5	887.5
Phase 2	2035 – 2045	81,483	189.3	252.5
Phase 3	Future Buffer		457.2	172

Note: Phase 3 has been intentionally reserved as a spatial buffer to accommodate long-term growth, road networks, and public services beyond the planning horizon.

i) Key Assumptions and Design Parameters

Total Residential Land: 1312 hectares

Permissible Construction Area: 787 hectares (60% of total land)

Plot Coverage Factor (FSI): Variable between 0.75 to 1.0

Standard Residential Space Allocation: 150 sq. ft. per capita

FSI Benchmark: FSI of 1.0 is proposed for optimal land utilization in urban cores, while 0.75 is considered for peripheral and lower-density developments.

ii) Industrial Land Allotment and Employment Phasing – Pithampur (Satellite Town to Indore)

As part of the strategic vision to position Pithampur as a high-employment satellite town complementing Indore, the land use framework integrates a substantial allocation for industrial and commercial employment-generating uses. Recognizing the region's potential as a manufacturing and logistics hub, a carefully calibrated distribution of land across key employment sectors has been undertaken.

1.9 Employment Land Use Classification and Allotment

The planning model incorporates three core employment-generating sectors: manufacturing, commercial, and logistics, each characterized by distinct employment density benchmarks and land area requirements.

Sector	Land Area (ha)	Employment Density (jobs/ha)	Multiplier	Direct Jobs	Total Jobs (Direct × Multiplier)
Manufacturing	2779	40	1.5	111,160	166,740
Commercial	1141	100	1.3	114,100	148,330
Logistics	100	10	1.4	1,000	1,400
Total	—	—	—	**226,260**	**316,470**

These figures are derived based on established planning norms and density assumptions:

- Manufacturing Sector: Assumes a mid-range employment density of 40 jobs/ha, aligning with national industrial park typologies.
- Commercial Sector: Designed for high employment concentration, estimated at 100 jobs/ha.
- Logistics Sector: Estimated conservatively at 10 jobs/ha, accounting for lower employee-to-land ratios.

8. Conclusion

1.1 Strategic Alignment of Proposals with Pithampur's Satellite Town Vision

The proposed development strategies—**Zonal Development Plan (Proposal 1)**, **Industrial Innovation District (Proposal 2)**, and **Multi-Modal Logistics Hub (Proposal 3)**—collectively fulfill the core aim of *transforming Pithampur into a self-sustaining satellite town that complements Indore while promoting balanced regional growth*. Critically, the **Indore-Pithampur Economic Corridor (IPEC)** serves as the transformative backbone for connectivity, enabling all proposals to achieve seamless integration with Indore.

Here's how the proposals align with this objective:

1. Decentralizing Pressure on Indore

- Population & Economic Redistribution:
  - Residential expansion (23% land allocation, up from 8%) absorbs **3.68 lakh residents by 2045**, reducing Indore's sprawl burden.
  - **Live-work hubs** near industrial zones leverage commute, eliminating daily long-haul migration to Indore.
- Job Creation:
  - **316,470 jobs** in manufacturing, logistics, and IT sectors anchor talent within Pithampur.

2. Integrated Economic Diversification

- Beyond Industrial Monoculture:
  - **Proposal 2 (IID)** introduces high-value sectors (IT/biotech/R&D), reducing reliance on auto/pharma and mitigating economic risks.
  - **Proposal 3 (MMLH)** leverages DMIC connectivity to position Pithampur as a **national logistics node**, attracting ₹20,000+ crore investments.
  - **Innovation Ecosystem**:
    AutoTech Valley and NATRAX-linked R&D foster technological innovation, aligning with India's EV/autonomous vehicle missions.

3. Sustainable Urban-Industrial Balance

- Dual-Core Spatial Strategy:
  - **Industrial Core** (30% land) and **Urban Core** (23% residential) are linked by Green Spine 500m-wide buffer, enabling mixed-use development.
  - **Green Spine** along highways counters pollution while providing recreational space.
- Housing-Employment Proximity:
  - Residential clusters along Non-polluting Industries ensure workers live within 5 km of industries, enabled by rapid transit.

4. Enhanced Regional Connectivity

- **Mobility Integration**:
  - **Indore-Pithampur Economic Corridor** (20–25 min commute) and **MMLH freight corridors** seamlessly link Pithampur to Indore's airport, ports, and markets.
  - Road widening and expressway nodes address last-mile gaps in peripheral wards.

- Critical Success Factors
- IPEC as Growth Catalyst:
  - The corridor's **75m-wide highway + 300m buffers** host industries, housing, and green spaces, enabling phased expansion (2025–2045).

1.2 Final Assessment

The proposals collectively reimagine Pithampur not as an industrial annexe of Indore, but as a synergistic satellite city—economically vibrant, socially inclusive, and ecologically resilient. By integrating job creation, housing, mobility, and green infrastructure, they holistically address Indore's urban stress while positioning Pithampur as a model for India's next-generation industrial towns.

1.3 Key Impact Metrics

Indicator	Current (2023)	Proposed (2045)	Change
Connectivity Efficiency	45–60 mins	20–25 mins	**–55%**
Residential Land	8%	23%	**+187%**
Industrial Output	₹12,968 cr	₹40,000+ cr	**+208%**
Jobs Supported	55,000	316,470	**+475%**

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